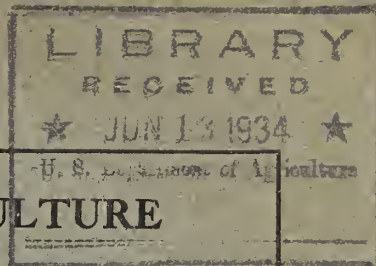


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UNITED STATES DEPARTMENT OF AGRICULTURE

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MARCH 1934

**DESCRIPTIONS OF TYPES
OF PRINCIPAL AMERICAN VARIETIES
OF GARDEN PEAS**

By

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Horticulturist, Division of Fruit and Vegetable Crops and Diseases
Bureau of Plant Industry
and

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Professor of Agronomy
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PURPOSE AND SCOPE

For a number of years the three industries of seed growing, canning, and trucking, through their national organizations, have discussed the need for accurate descriptions of the important varieties in the crop plants with which they are concerned. It was at their suggestion that Congress made available the funds for such studies.

The purpose in view in the publication of this sort of varietal study is to give as great definiteness as possible to the varietal concept of the important varieties of vegetables. These descriptions should serve as a standard of varietal type by which to compare stocks as delivered; they should discourage too ardent pursuit of profits from novelties, while facilitating the improvement of the present list of varieties. The process of standardization of varieties of plants varies fundamentally according to whether the variety to be standardized is vegetatively propagated (a clonal variety) or is grown each year from seed (a seed variety).

Most of the standardization attempted in the past has been in connection with clonal varieties. This includes nearly all fruits, potatoes, and sugarcane. The description of a clonal variety, as the Baldwin apple, is a very simple and definite undertaking as compared with a description of a seed variety, such

as Golden Bantam sweet corn. For the first, no question of genetics is involved; for the second there is an annual seed generation with its problems of field crossing and yearly reassembling of heritable characters. The only care necessary to preserve the Baldwin apple is that of choice of scions. To preserve Golden Bantam corn, a carefully conducted annual campaign is required, all the elements of which are far from being understood. The apple can be narrowly defined. The corn must be described with considerable latitude.

Peas, however, are propagated from seed. But because of their close pollination, they can be given greater definiteness of description than most vegetables even approaching that of plants subject to clonal propagation.

It might be supposed that the establishment of as definite types as possible would tend to retard varietal improvement; this does not seem likely to happen, however, and it is probable that with changes in tastes and market requirements a type book like this will require rewriting at intervals if it proves sufficiently useful.

Since the inception of the work on this type book 4 years ago, considerable changes have taken place, some of which are noted in the later varietal notes. Some new types developed by seedsmen or the experiment stations are promising to replace certain sorts here included.

PEAS AS A CROP IN THE UNITED STATES

Peas are grown in every part of the United States and are probably the most popular of all the garden vegetables brought to our shores by European immigrants. They are exceeded in acreage and value only by such crops as tomatoes, sweet corn, beans, potatoes, and sweetpotatoes, which are all of American origin.

Few home gardens fail to include a planting of peas, and many varieties are carried by seedsmen entirely because they are popular with the private gardener.

Peas are increasingly important as a trucking crop, owing to improvements in transportation and refrigeration. They have always been extensively grown as a crop for nearby market.

As a canning crop, peas have in recent years ranked third in acreage, being exceeded by tomatoes and sweet corn. In value of canned product peas stand second, next to tomatoes.

Over 3 million bushels of dry field peas were grown in the United States in 1929 as shown by the last census. These dry peas are used for human food as whole or as split peas. A small amount is still canned as "soaked peas." They are an important pigeon feed, and they enter into poultry-feeding mixtures. In parts of the United States, notably in Colorado they are largely used for livestock feeding.

Some types of peas are grown for green manure, and winter cover crops, especially in the Southern States. Finally, peas planted alone or with other crops are used for hay.

HISTORY

The oldest evidence of the cultivation of peas is found buried in the mud which lay beneath the ancient pile dwellings of the Swiss lakes. The peoples who left these records were agriculturists with cultivated crops and domesticated animals, who were in the polished-stone cultural stage. The period of the pile dwellings in central Europe is usually dated between 4,000 and 5,000 years ago. The seeds recovered from

the Swiss lakes are small, much like some of the types now grown for field peas.

Peas apparently have two primary points of distribution, Abyssinia and the Persia-Afghanistan mountain region, with a secondary center in Mediterranean Europe.

Since the beginning of written records peas have been introduced into China from Persia, about 400 A.D., and into the Americas from Europe following the early explorers, about 1500 A.D.

DIVERSITY OF PEAS

The pea shows a very considerable range of diversity in nearly all its characters. Its seeds range from round and smooth to angular and wrinkled in shape and surface, from translucent to opaque in epidermis, which may be white or mottled with a number of patterns, or may be solid purple or other colors, with or without a colored hilum or eye. Its cotyledons, which make up the body of the seed, may be green or yellow. The ripened dry seeds may vary in weight from about 200 peas per 100 grams to over 2,000. They may be separate in the pod, or all may adhere as a single mass of peas when shelled.

The starch grains may be single or they may be formed of a cluster of smaller grains.

The pods may develop with transverse diagonal fibers in the walls for dehiscence when ripe, when they are called shelling peas, or they may lack this layer of fibers, often called "muslin" or "parchment", when they are spoken of as edible-podded or sugar peas. Sugar peas may be flat-podded, with thin walls, or they may be round-podded, with thick, fleshy walls. Pods may vary in shape, being straight or curved, pointed or blunt at the end, and under the best cultural and climatic conditions they range from 2 to 8 inches in length. They may vary from various shades of green to yellow or purple in color. Flowers may be white or

colored with pink or light purple, they may be small, or they may approach the size of the blossoms of the sweet pea (*Lathyrus odoratus*); they may be carried singly or in 2's or 3's on the peduncle. When the blossoms open they may be held erect or be drooping. The leaves may have 1 pair of leaflets or as many as 3 pairs. Usually the leaves end in a branched tendril, but there are varieties in which these tendrils are replaced by leaflets.

The plants vary greatly in the number of joints or nodes, in the presence or absence of branches, in the length of the internodes, with a resultant difference in height from 9 inches to 10 feet. Some varieties have the upper part of the stem fasciated or flattened, which brings the flowering nodes close together and makes a flower cluster more or less resembling an umbel.

There are listed at the present time in this country some 1,000 to 1,200 varieties of peas; and although many of these are duplicates, it would be easy to distinguish several hundred varieties among those found in commerce that are at present fairly well selected. By careful selection and hybridization this number could be increased almost indefinitely. It will therefore easily be realized that the few varieties that at present furnish the bulk of the pea industry represent a very limited range in the possible variation of peas.

In the United States the important types of peas are white-flowered, wrinkled, shelling peas, ranging in height from 15 inches to 5 feet, and all comparatively early in season. Edible-podded or sugar peas have never become popular in this country, though a few varieties, some of them with colored flowers and seeds, are regularly listed by seedsmen for home-garden use.

VALUE AND STABILITY OF VARIETIES

A variety of peas can be taken to be a stock presumably descended from a single plant which may be a selection from an earlier variety or from a hybrid. This descent is sometimes capable of proof, sometimes is a very probable conjecture, and sometimes can only be surmised.

Varieties as developed may be for various purposes, as earliness, hardiness, productiveness, and table or exhibition quality. The most important commercial character, however, is uniformity. Uniformity in a home-garden sort is not of so great value as in a market-garden type, where even ripening may mean much in crop planning or where a uniform sample may be of great importance in making an acceptable market product. Uniformity in all characters is most important, however, in a canning pea, since the stipulations of buyers of canned products are very exact, and it is almost impossible to make a fancy canned sample from a mixed lot of peas.

Probably one of the most fundamental things to remember about peas is that the crop is a native of the temperate regions of the Old World. A second fact, which fits in with this, is that the United States extends farther toward the Tropics than any European country, and that our climate gives us much hotter and drier summers than are found where peas are native or where the plant was developed into its present cultivated varieties.

England and the north of Europe are the home of cultivated peas, and most of our present sorts are of English origin. We have but limited districts which would impress an English grower as being well adapted to peas. The best is that around Puget Sound in western Washington. New England and the northern portions of the States bordering Canada, with certain mountain regions of sufficient altitude, furnish a series of districts well adapted for peas but hardly ideal. In these places the whole growing season is usually favorable for pea growth, and all types of peas can be successfully grown.

For the remainder of the country suitable seasons of weather are short and uncertain. In the Corn Belt and the upper South, peas can be grown in the cool weather of spring, but late varieties are finally destroyed by the heat of summer. The cool weather of the fall is again favorable for growing peas, but the frosts of winter put a more definite end to the plants than the summer heat does to the spring planting. In the ex-

There is some evidence of increasing use of sugar peas in the United States.

Peas belong to that small group of garden vegetables in which the seed is the part sought for food; hence a description of the plant as grown for use will include a whole life history, while a description of a root, leaf, or stem vegetable would not necessarily include the later stages of growth.

treme South the winter season may sometimes be fairly well suited for peas, wherever the winter is sufficiently free from frost to give a good growing season.

This means that the main part of the United States can only grow short-season varieties. The conditions described above apply to all temperate European garden plants, but to none of them in a greater degree than to peas. One of the large English seedsmen lists all his varieties in five groups, based on season of table maturity. The English climate allows all these varieties to be grown in any one garden. It is interesting to note that the entire list described here falls within his first two groups. It is even more surprising that the growing season in this country so hastens the development of peas that all these varieties mature well within the time required for his first, and extra-early, list. Alaska, the earliest variety, is ready for table from early May planting at Sturgeon Bay, Wis., in about 60 days, while in the English Midlands it takes 77 days. The latest variety described, Alderman, is ready at Sturgeon Bay in 77 days.

In the best growing regions peas will grow taller and will have a larger number of productive nodes. About Puget Sound, if pods are continuously harvested just as soon as ready for table use, the plants of some of the strong-growing varieties will continue to grow and bear much as sweet-pea plants grow when the blossoms are cut. Sometimes, under very favorable growing conditions, varieties, which under other conditions produce few if any branches, will send out branches. What is usually considered as the normal pea climate, or normal pea growth, because it is the most common in this country, is really subnormal for the plant, at least in the opinion of Europeans. It is thought that the choice of the Peninsular Branch of the Wisconsin Agricultural Experiment Station, at Sturgeon Bay, Wis., for growing tests is a fair one, as it represents a little above the average growing conditions for peas found in the United States; that is, it is better than most of the rest of the country, although not so good as a few most-favored spots.

Culture, climate, and soil affect pea plants very noticeably. Under these influences some characters vary more than others. In general, vegetative characters vary more than reproductive characters, size of parts and vigor of plants are very variable, the presence of branching is less variable, and probably the node where

the second pair of leaflets occur and the node bearing the first blossom are most stable under all conditions.

The size of pods will vary, but the shape is more stable. The number of productive nodes depends to some extent on the vigor of the plants. In the dry seed the type of wrinkling is fairly uniform. Color of cotyledons is quite constant, though green peas may become yellow under certain conditions, and the ripe seeds of varieties normally yellow may under proper conditions be green.

While earliness is an important character in the comparison of varieties, it is easily overstated. Earliness probably varies more under different climatic conditions than most characters. Any variety will

mature in fewer days from a late planting than from an earlier one. Planted at the beginning of our growing season a variety will mature sooner in the southern part of the United States than in the North.

It is surprising in observing a large planting of peas whether located in the Upper Peninsula of Michigan or at Washington, D.C., to find that the "early peas", often composed of varieties advertised to be "10 days" or "a fortnight" earlier than any other pea, begin to bloom at about the same time. Testimony as to this is almost unanimous among men who conduct trial grounds. It is, of course, possible that in a climate more ideal for peas the advertised interval of earliness might be more apparent in trials.

PURITY OF STRAIN IN PEAS

The physiology and anatomy of the pea flower go far to insure self-pollination, the receptive pistil being placed among the 10 anthers. These anthers open some hours before the flower expands, so that the pollen has already been shed when the fully opened flower appears. This arrangement and behavior of the flower has made the pea a classical subject for studies in genetics. It has led also to the belief by horticulturists and breeders that cross fertilization did not take place in peas. In the practice of seed growers, little care is taken to isolate different varieties. In ordinary genetic studies of normal peas, even when accurate results are sought, usually no isolation is provided.

In studying the inheritance of certain abnormal types, Brotherton¹ found that protection was essential for careful work. It is also of interest that among the field workers who have spent their lives growing peas for the seed trade one often finds a strongly held belief that in occasional years a considerable amount of cross-pollination occurs in peas. This impression, being the result of a lifelong attempt at maintaining commercially satisfactory stocks, is worth consideration though the observation cannot be closed with a

plus or minus sign, expressive of the amount of doubt due to sampling and the personal equation.

The provision of self-pollination in peas gives only limited insurance. If the unopened perianth fails to give safe protection to the essential organs, if the opening of the anthers is delayed for a few hours, or if for any reason pollen formation is faulty or absent, cross fertilization may occur. It is now found by some seedsmen that in commercial practice, isolation of stocks has come to have practical significance.

While it can be admitted that the danger of natural cross-pollination in causing stock deterioration is less than in any other important seed crop, yet this is more than compensated for by the great danger of mechanical mixture. This is due to the large quantities of seed to be harvested, threshed, cleaned, hand-picked, warehoused, and shipped each year. The necessity for the greatest care in cleaning machinery and warehouse floors when beginning work on each succeeding variety adds greatly to the expense of handling; it is never possible to make this care entirely effective, and a great part of the roguing of fields of growing seed peas is made necessary on account of mechanical mixture.

TECHNIC OF MAINTAINING COMMERCIAL PURITY

Usually no isolation is attempted. Very great care is taken to avoid mixture in the various mechanical operations which the peas must undergo in the journey from the field to the final retailers' bins. This care may be regarded as preventive or corrective. The care to prevent mixtures applies to harvesting, where there is sometimes danger that wind may mix varieties that have been cut and are being cured for threshing; to threshing, where machinery must be very thoroughly cleaned when the change is made from one variety to another; to labeling all bags of threshed peas, tags being placed in the bags as well as outside; to cleaning warehouse floors and machinery between

the handling of each two varieties; to the final storing of the completed lots; to cleaning drilling machines between the handling of varieties on trial grounds and increase plots; and to care in labeling and mapping these plantings. With all the care possible, however, it is not practicable to avoid all mixture. The mechanical care to correct mixtures includes screening, when the varieties mixed vary in size enough to make this feasible, gravity cleaners to separate smooth from wrinkled peas, or hand picking, when the varieties concerned can be recognized visually. Another danger of mixing which might be regarded as mechanical is that arising from planting on ground where field peas have been grown the preceding year. In parts of the seed-pea growing region, cultural and climatic con-

¹ BROTHERTON, W., JR. THE HEREDITY OF "ROGUE" TYPES IN GARDEN PEAS (*PISUM SATIVUM*). Mich. Acad. Sci. Ann. Rpt. 21: 263-279, illus. 1919.

ditions make possible the contamination of the succeeding crop grown for seed by volunteer plants from the earlier crop. The risks to varietal purity that cannot be grouped as mechanical are far from being fully understood and are blamed on hybridization or on some unexplained inner constitution of the plants.

There are a few tendencies present in peas that are sufficiently definite to warrant discussion.

Many if not most pea varieties if left without care for a number of years will produce plants longer and later than the type. Since earliness and short stature are characters of value, these taller, later plants are of their own right of less worth, and they lessen the uniformity of the planting. This tendency is to be noted in most varieties, but especially in the round, smooth-seeded peas, such as the Alaska. Whether this is caused by hybridization is not yet definitely known, though some of these longer plants behave like hybrids. It has been found by some seed growers that isolation in the early years of breeding up strains of Alaska from single plants, and similar care of seed stocks, largely eliminates the long plants from the commercial seed. Some seedsmen have found a prospective market for this long-vined late type of Alaska and have made attempts to produce uniform stocks derived from single plant selections of this type. All reported attempts at fixing these types have failed to give the desired uniformity. The plants referred to are more robust and often hardier than the type desired.

Many varieties of peas produce plants which become almost vetchlike, having smaller leaves, blossoms, and pods, or some type of deformity of leaf or blossom. The form most frequently encountered in this type of variation has been called "rabbit-ear rogue" by seedsmen and scientists.

Not all varieties of peas produce rabbit-ear rogues. Other degenerative variations are distorted leaves, empty pods, or smaller pods.

Aside from the mechanical care given in the harvesting, handling, and warehousing of seed peas, careful seed growers must combat the nonmechanical mixtures. This is done by a process the seedsmen call roguing, in which they include the removal of the undesirable types from their stock fields whether mechanical mixtures, volunteers, hybrids, or degenerative plants. This operation probably originated in the seed-pea industry, though roguing is done for other crops. It has a long history and has probably never been described in more compact and forceful language than by Batty Langley,² of Twickenham, England, over 200 years ago:

N.B.—It is observable, that altho' a Person is as careful and nice as possible a Man can be, in the saving of Pease for Seed; yet there are always, amongst all Sorts of Pease some few that will degenerate the very first Year of sowing, and will not either be in bloom, or ripe so soon as the others, by a full Fortnight, and oftentimes three Weeks.

These degenerate Pease are by the Gardiners called *Rogues* and are discovered by the Over-rankness of their *Haulm*, as well as by their late and untimely Produce.

The reason why I mention these degenerate Pease is, that you may take a careful Survey of them amongst all your Pease intended for Seed: For if they are not carefully pricked out from the others, but are suffered to mix therewith, your Kind will immediately be worth nothing, and very much deceive every one that sows the same.

While more is now known of the sorts of rogues, and somewhat more of their inner constitution, it is yet true that now and then peas of very innocent appearance do "very much deceive" everyone who handles them, as is proven by the records of the courts.

HISTORY AND IMPORTANCE OF SEED-PEA GROWING IN THE UNITED STATES

Peas were among the first seed crops to be grown in the United States, and the pea-seed industry is today the most important horticultural seed-growing enterprise in this country.

Pea-seed growing began in North America near the shores of Lake Ontario, in northeastern New York, and in Canada. It has traveled westward with the growth of the industry and is now most important in the States

of Idaho, Washington, and Montana. As it migrated, it was located for a number of years in Michigan and Wisconsin. While the crest of the wave of pea-seed growing has been persistently moving, the industry has not completely abandoned the regions where it was once important; therefore, New York, Michigan, Wisconsin, and California still grow seed peas.

CHOICE OF VARIETIES FOR THIS STUDY

In 1921, the last year for which there is a summary, American seedsmen listed about 850 names of pea varieties, 68 percent of the names being used by but one firm. This list includes many names only distinguished by a possessive or by adjectives, such as early or improved. Yet there were probably 150 or more recognized varieties or strains handled that year by dealers. The list described here was chosen from this large number as follows: The leading seed-pea growers of the United States were requested to furnish a list of the varieties which together represented 90

percent of their trade in peas. These lists were compared, and a set of varieties chosen which were thought roughly to approximate that percentage of the trade. Acreage and production figures were not at hand, but the proposed list was submitted to the representatives of the growers and approved by them.

As appears in the later varietal descriptions, the list includes varieties most valuable for canning, home gardening, and trucking. Of these three industries,

² LANGLEY, B. NEW PRINCIPLES OF GARDENING . . . PART VII. OF THE KITCHEN GARDEN. p. 132-133, London. 1728.

home gardening is the oldest, the next is canning, and the most recent is trucking. The attitude toward varieties taken by these three industries is quite different. The home grower is an ultimate consumer producing peas for immediate consumption or in some cases for home canning. He is ordinarily more concerned with quality than with any other character of the varieties he grows. Productiveness and earliness are also important. Competition with his neighbors for the earliest or the finest product is a strong incentive. This competition shows some evidences of becoming organized into exhibitions, which in England have had a very important bearing on the choice of varieties. Curiosity is distinctly in evidence, and the superlatives and the often impossible illustrations of the annual seed catalogs appeal to him. The novelty pages are written only for the home gardener. He is attached to certain old varieties, and for his sake the seedsmen must carry many sorts, even though in extreme cases they may be present by name only. While home gardening was about the only interest in peas until well after the Civil War, it has comparatively lost ground in recent decades to the canning industry, which increased rapidly, and more recently to the trucking interests. The home gardener tends to disappear with the increasing trend to urban life. The city garden is much more apt to be a flower garden than a vegetable garden, and many city residents can have neither. Appeal to the home gardener is still an important element in the seed trade, but is secondary to the demand for seeds for canning and trucking.

Canners and truckers are not producing for their own use, and are primarily interested not in their

crops of peas, but in the net financial returns they hope to receive from them. Quality thus becomes of interest only as it affects returns and is much more apt to be interpreted in terms of appearance than of food value or flavor. Canners and truckers are interested in a few varieties, usually the fewest possible varieties, and these are chosen by the canner to come in seasonally to keep his factory going as long a time as possible, to fit the requirements of his machinery, and the tastes of consumers as interpreted to him by the middleman.

His varieties therefore must not be too tall or too short, and they must be productive and hardy. Some years ago he was certain that he must have small-seeded varieties, because the smallest peas when sieved out brought the best prices. But when he got these small-seeded varieties it soon happened that the small-sized peas became less popular, and at present there seems to be a tendency to the use of larger-seeded sorts. To both the canner and the trucker the general varietal quality of uniformity is much more important than to the home gardener, because in various ways for the canner a mixed lot of peas will show in lessened financial returns from his factory.

Since the trucker ships his product in pods, his choice of varieties is largely made on pod characters. His plants must not grow too tall, since peas are not supported in either a canning or a trucking planting, except in a recently developed trucking industry in the Puget Sound district, where the tall varieties are grown on trellises. They also must be hardy and productive.

CULTURE OF VARIETIES FOR THIS STUDY

The varieties chosen for this study were planted and studied for 3 years at the Peninsular Branch of the Wisconsin State Agricultural Experiment Station at Sturgeon Bay, Wis. Few districts in the United States have experienced a more intensive culture of peas than has the Door County Peninsula between Green Bay and Lake Michigan. Peas as a seed crop have not persisted here, though some field peas are now and then seen. The season of 1929 brought a devastating attack of the pea aphid, with accompanying mosaic, which very seriously reduced the possibility of worth-while notes. In 1930 a new plot of

ground was chosen and broken from sod. The cultures were very successful that year, and satisfactory notes were obtained. In 1931 the restricted number of lots which had been chosen were planted again with good results. The rows were spaced about 4 feet apart. Woven-wire fencing was used to support the plants and was placed on stakes driven in immediately after the seed was planted. These supports proved well worth the expense of installation in the better opportunity they gave for full observation of the growing peas. Each year the culture was thorough and careful.

DESCRIPTIVE TERMS DEFINED

The pea germinates by leaving its hemispherical cotyledons underground. It sends its young stems up to light and air, and the stem is supplied with two joints or nodes in which the leaves are reduced to bracts which show rudimentary stipules and midribs. These two bract-bearing joints are left below the surface of the soil if the seed has been planted at a depth greater than one half inch.

The term "node" is used throughout, and refers to the joints of the stem where leaves, bracts, and blossoms are produced. Internode is the interval on the stems between nodes. In counting nodes the two basal nodes above the cotyledons bearing rudimentary leaves have always been included. Pea leaves are quite specialized. They are compound, with leaflets arranged in pairs. In the forms considered here, these

vary from 1 to 3 pairs of leaflets, with the common leafstalk or rachis extended beyond the last pair of leaflets into a branched tendril with 1 to 3 pairs of branches and a terminal extension. At the base of leaves in general is sometimes found a pair of organs, usually leafy, called "stipules." The stipules in the pea leaf become of more importance than any single pair of leaflets, as they are larger and so are more efficient as assimilating organs. The stipules in the pea clasp the stem at the node, with a lobe that projects below the point of attachment. Both leaflets and stipules usually show irregular areas where the epidermis is underlaid by a thin layer of air. This appearance is here spoken of as marbling. The term

"mucronate" used in this publication refers to a very short spine sometimes found at the upper end of leaflets and of stipules. The angle above the leaf and between it and the stem is called the "axil" of the leaf. It is from leaf axils that blossoms are produced. Blossoms are also very specialized. They are made up of five petals. The upper one is widely expanded, and is called the "standard," and is the largest petal. Two which flank the standard below are called "wings," and the two lowest grow together and form a case protecting the style and stamens, and are called the "keel." The stem on which the blossoms are carried is called the "peduncle," and in the varieties discussed bears one or two blossoms.

CLASSIFICATION OF VARIETIES

The arrangement of the few varieties included in this publication is according to the following classification, based on habit of plant, earliness, and size of pod.

Stems straight-- (tall peas)	Early--	Small pods--	1. Alaska.
		Large pods--	2. Surprise.
	Late--	Small pods--	3. World Record.
		Large pods--	4. Gradus.
Stems zigzag-- (dwarf peas)	Early--	Small pods--	5. Thomas Laxton.
		Large pods--	6. Admiral.
	Late--	Small pods--	7. Green Admiral.
		Large pods--	8. Telephone.
			9. Alderman.

Stems zigzag-- (dwarf peas)	Early--	Small pods--	10. Nott Excelsior.
		Large pods--	11. Little Gem.
	Late--	Small pods--	12. Cannors Gem.
		Large pods--	13. Little Marvel.
			14. Hundredfold.
			15. Progress.
			16. Laxtonian.
			17. Advancer.
			18. Perfection.
			19. Sutton Excelsior.
			20. Daisy.

DESCRIPTION OF VARIETIES

One of the purposes in view in the publication of this series of type books is that they may serve to help in comparison of stocks. It is important when such comparisons are attempted that certain principles be observed. The most important of these is uniformity of opportunity for the stocks to be compared. From this it follows that they must be grown side by side. It is hopeless to try to compare stocks grown in different localities, except in the greatest possible variations. Even when the trial is on one piece of ground it is important that this be carefully chosen for uniformity. Complete equality is of course the unattainable ideal, since no plot of ground is uniform. If fertilizer has been applied, it must have been the same for all lots. Ample space should be left for each lot to develop fully. For finer comparisons some form of support for the vines is advisable, and should be provided immediately after planting. Probably most important of all, the lots to be compared should be planted on the same day.

If the greatest advantage is to be gotten from any comparison, it must have been planned. It is probable

that most comparisons desired by growers or canners will be of the unplanned type. They will be of value, but it is well to keep plainly in mind the points of danger in making comparisons between two plantings which have had unequal opportunity for growth.

The varieties described in the following pages are listed in table 1 in the order of their introduction.

TABLE 1.—*Pea varieties in order of age*

Year introduced	Name	Originator	Parentage
1853	Admiral (Fairbeard's Nonpareil).	Fairbeard.....	
1860	Advancer.....	McLean.....	Beck's Gem × wrinkled pea.
1862	Little Gem.....	do.....	Do.
1878	Telephone.....	Carter.....	Selection from Telegraph.
1881	Earliest of All (Alaska).	Laxton.....	Ringleader × Little Gem.
1887	Sutton Excelsior.....	Culverwell.....	Paragon × American Wonder.
1887	Gradus.....	Laxton.....	Alaska × Duke of Albany.
1889	Surprise.....	Horsford.....	Alaska × American Wonder.
1891	Nott Excelsior.....	Nott.....	American Wonder × Advancer.
1892	Alderman.....	Laxton.....	Cross of unnamed seedlings.
1892	Daisy.....	Carter.....	Stratagem × unnamed seedling
1898	Thomas Laxton.....	Laxton.....	Gradus × Alaska.
1900	Little Marvel.....	Sutton.....	Chelsea Gem × Sutton A 1.
1907	World's Record.....	do.....	Harbinger × Early Giant.
1910	Laxtonian.....	Laxton Bros.....	Cross of unnamed seedlings.
1910	Hundredfold.....	Sutton.....	Gradus × Sutton Excelsior.
1921	Progress.....	Laxton Bros.....	Cross of unnamed seedlings.
1925	Green Admiral.....	Rogers.....	Selection from Admiral.

ALASKA (EARLIEST OF ALL)

BRIEF CHARACTERIZATION

The earliest pea of the list here treated, and the only smooth, round-seeded variety here described. It is used for canning, home garden, and nearby market.

It grows a straight, slender stem about 30 inches high; unbranched; and bearing short, square-ended pods with 5 to 8 seeds. These when ripe are round, smooth, or slightly pitted and green in color.

Its hardiness and earliness enable it to escape many of the troubles which may affect later and better varieties.

ADAPTABILITY AND USE

Alaska is suited for growing over a wider extent of territory than any other variety included in these descriptions. Its short season enables it to arrive at table maturity in the cool weather of spring anywhere in the United States, no matter how brief that period may be. At present it has a greater acreage and larger



FIGURE 1.—Alaska. $\times \frac{1}{4}$.

amounts of capital invested in its seed production than any other vegetable. In 1917 it occupied more than half the acreage of peas for canning. While no recent figures are available, it is certainly the most important canning variety and must approach one half the present acreage. It is extensively planted for home gardens and is planted somewhat for market gardens and for long-distance shipping.

The characters which give it this predominant position are its earliness, its medium height, which fits it well for canning machinery, and the green color of its dry seed which saves the canner from too evident signs of overmaturity in the canned product when canned in overripe condition. English and American consumers have always regarded smooth-seeded garden peas as less desirable in table quality than wrinkled peas. From the consumer's standpoint there would seem to be little reason for Alaska's popularity. As long as the consumer is not supplied with anything better, however, Alaska will be grown and canned, though it will doubtless be the first variety to feel the pinch of competition. It has some decided advantages for the canner. On account of its short season and its hardiness it is grown for canning farther south than any other variety. It matures from 9 to 12 days earlier than most of the wrinkled canning sorts. Thus for the southern portion of the pea-canning territory it is the only variety used, and for the northern portion it is possible to increase the acreage tributary to a single cannery by planting Alaska, thus lengthening the time of the packing campaign. One of the most serious handicaps in pea canning is the occurrence of disastrous periods of drought and high temperature, which may occur in midsummer anywhere in the eastern United States. Alaska escapes these periods better than wrinkled varieties.

Recently, selection has been undertaken on Alaska to find strains resistant to *Fusarium* wilt, and sufficient progress has been made in this direction so that large quantities of Alaska claimed to be resistant are being placed on the market.

Dealers in canned peas class the whole production as Alaskas and "sweets", thus setting this variety over against all the wrinkled canning sorts.

SEASON

Alaska is the earliest pea of the list here treated. At Sturgeon Bay, Wis., from early May planting it was ready for table use in about 62 days.

PLANT

(Pl. 1 and fig. 1)

Stem slender, 3 mm (one eighth inch) in diameter, straight, light green, under any but the most excep-



L. C. C. KRIEGER, PINX

LITHO EASTERN OFFSET INC. BALTO

A plant of Alaska showing a typical medium-green foliated variety. $\times \frac{3}{4}$.



ALASKA



SURPRISE



NOTT
EXCELSIOR



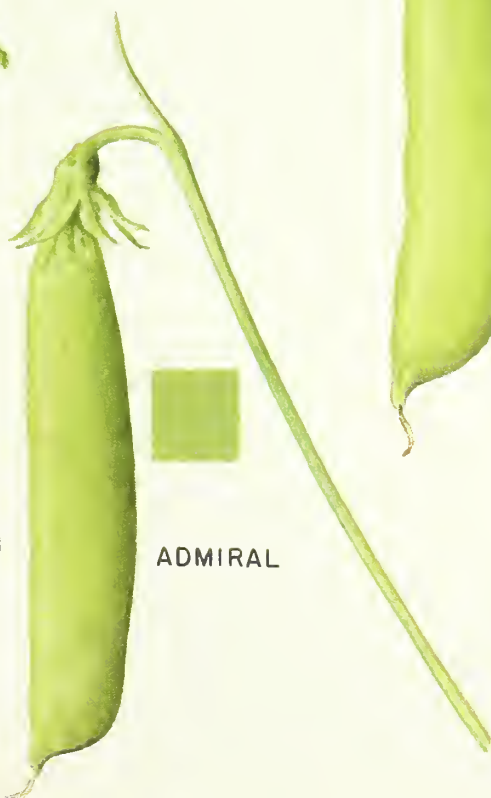
LITTLE GEM



ADVANCER



CANNERS GEM



ADMIRAL



GREEN ADMIRAL

tional conditions unbranched, comprising 14 nodes, and bearing pods from the ninth to the thirteenth nodes, inclusive. Height 60 to 70 cm (24 to 28 inches), each internode averaging 4.6 cm (1¾ inches). The longest internode is about 10.4 cm (4¼ inches).

LEAVES

Leaves light green (22 L 6) ³ with 1 pair of leaflets up to the tenth node. There are never more than 2

of the stipule is smooth. The stipules are moderately marbled.

BLOSSOMS

(Fig. 2)

The blossoms are drooping at flowering time; with few exceptions carried one to the peduncle, which is about 3½ cm (1½ inches) long. The standard is 24 mm (1 inch) long by 29 mm (1½ inches) broad; the

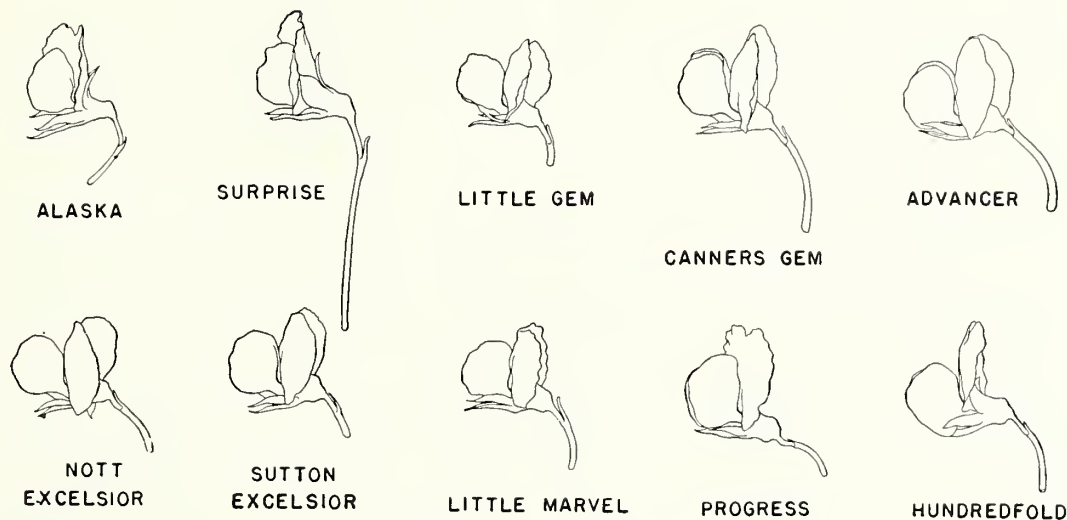


FIGURE 2.—Expanded blossoms. Natural size.

pairs of leaflets and 2 pairs of side tendrils. At the eleventh node the length of the rachis is about 13 cm (5½ inches). The leaflets are elliptical, acute at the tip, often mucronate, and the margins are smooth. The leaflets measure about 42 by 34 mm (1½ by 1½ inches) for the first pair, and approximately 69 percent as long by 72 percent as broad for the second pair. They show slight marbling.

wings are 18 mm (three fourths inch) long by 11 mm (one half inch) broad; the keel is 13 mm (one half inch) long.

PODS

(Pl. 2 and fig. 3)

The blossoms develop into pods which are about 6.5 cm (2½ inches) long by 13 mm (one half inch) wide,

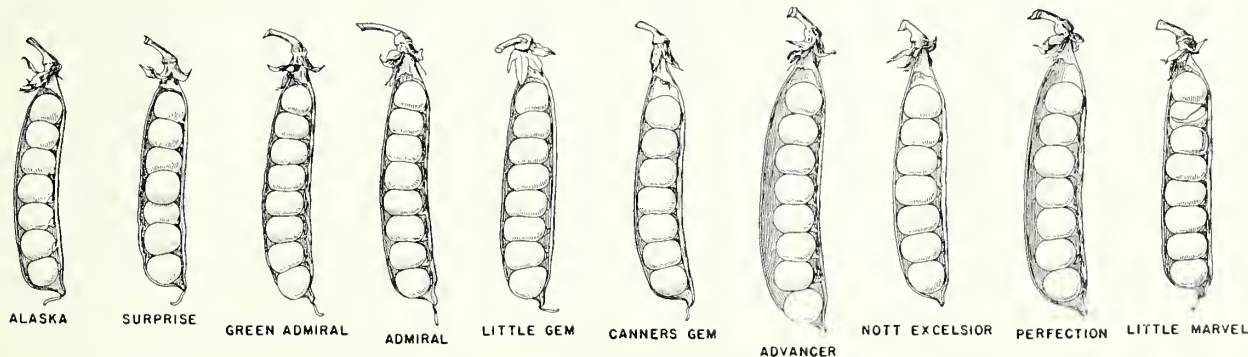


FIGURE 3.—Pod outlines. × ¾.

The stipules are flat, acute at tip, often mucronate, and at the eleventh node are 45 mm (1¾ inches) long by 36 mm (1½ inches) broad. The lobe extends 24 percent of the length of the stipule below its attachment, and is dentate in margin. The upper margin

light yellowish green in color (19 K 4), nearly straight, with a square end and a large tip. The mature peduncle varies at different nodes from 3 to 8 cm (1¼ to 3½ inches) long. The pods when grown are round in cross section and contain from 6 to 7 ovules, ripening 5 to 6 seeds.

³ All color notations refer to A Dictionary of Color, A. Maerz and M. R. Paul, 1930.

PEAS

(Pl. 3)

The well-developed peas are small, 9 by 8 by 7 mm at table stage and medium green in color. When dry they are green in color, though they may be bleached by the weather into yellow. They are spherical in shape, usually pitted, but sometimes entirely smooth. There are about 400 peas per 100 g (112 to an ounce).

HISTORY

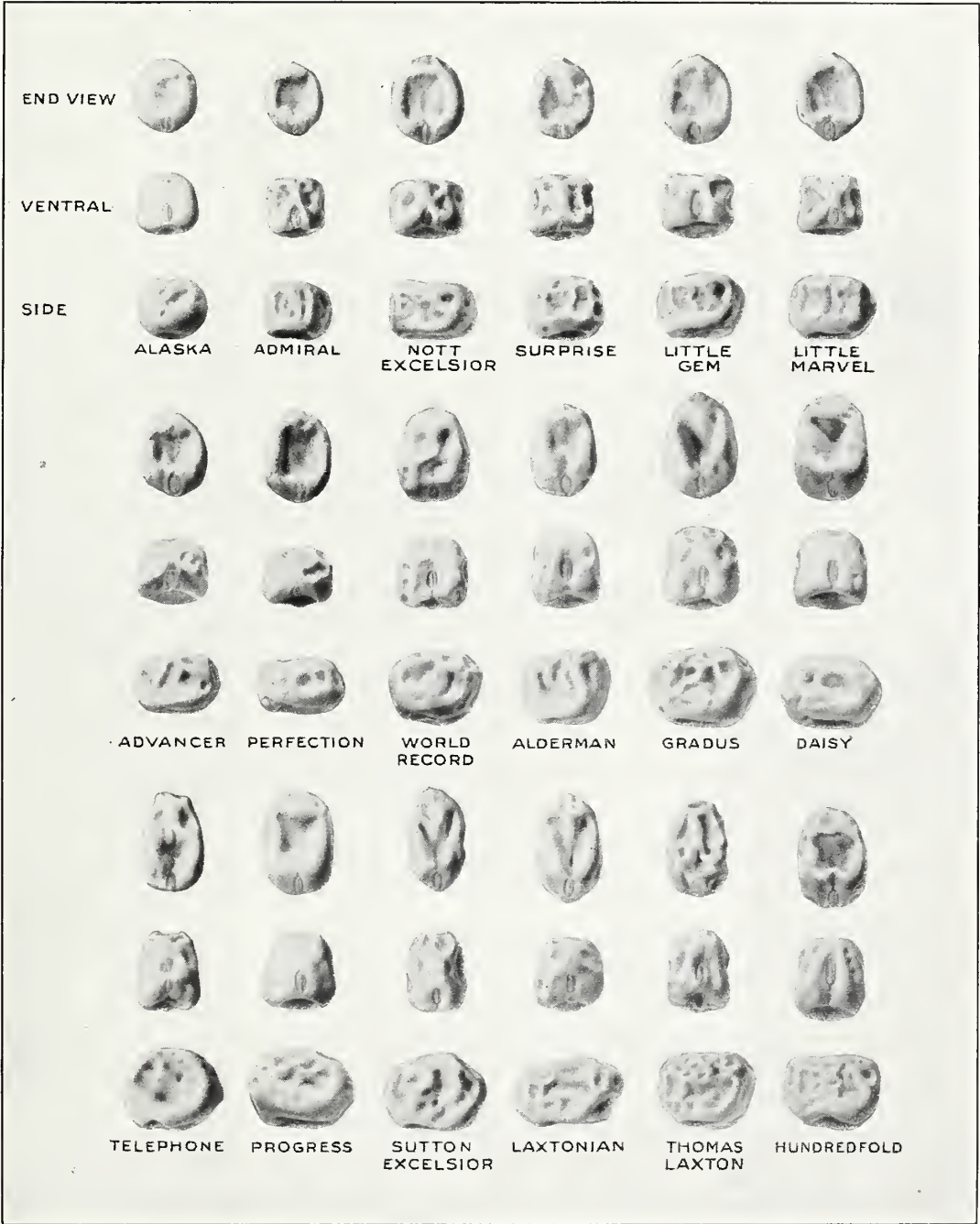
By any system of priority this variety should be called Earliest of All. This change is not made here, however, as vegetable growers have not seriously adopted any system of naming and as Alaska is the name used predominantly in the United States.

About 20 percent of all American seedsmen who at present quote Alaska peas list them as Alaska or Earliest of All. Earliest of All was introduced by Thomas Laxton, of Bedford, England, in 1881, and was announced as a seedling from Ringleader crossed with Little Gem. Ringleader is a variety almost identical with Extra Early, a smooth, round yellow pea, widely grown at present. Earliest of All was offered in the United States by J. J. H. Gregory of Marblehead, Mass., in 1882, and was quoted by a number of American seedsmen in 1883.

The name Alaska was given to this variety by A. B. Cleveland, of Cape Vincent, N.Y., about 1884. It was distributed as a premium for subscriptions by the agricultural periodical, *The Rural New Yorker*, which announced the distribution in its November number of 1885. In this publication it was claimed to be new and to have been bred through 6 years' work on Kentish Invicta. The name was applied because in the race for speed in crossing the Atlantic the Guion Line held the record with its steamship *Alaska*, built in Glasgow in 1881. This ship was the first to make the trip in less than 7 days, making this record eastward, New York to Queensland, in 1882. In 1885 the same boat made the westward trip in less than 7 days. From notes ⁴ taken by W. W. Tracy, Sr., it is plain that he came to the conclusion in trials, made 1885-90, that Alaska was identical with Earliest of All. It is possible to find Kentish Invicta quoted even now in odd corners of the world, but when bought these stocks appear to be poor stocks of Earliest of All or Alaska. The writers have no way of knowing what Kentish Invicta was like in the latter seventies.

There seems to be very little doubt, therefore, that Alaska is Earliest of All, as claimed by 1 seedsman out of every 5 at present quoting this variety.

⁴ Unpublished data in the files of the Bureau of Plant Industry.



Dried seed (natural size).

GREEN ADMIRAL

(Figs. 3, 4, and 7 and pl. 2)

Green Admiral was introduced in 1925 by Rogers Bros. Seed Co., Alpena, Mich. It is a selection from Admiral, which since this new introduction has often been called White or Yellow Admiral.

It differs from Admiral in the color of the dry seeds. This color is regarded by some canners as an advantage. It tends to mask the presence of overripe peas in a pack, and so may be of questionable value to a canner, in the long run, as encouraging careless packing.

It carries more branches than Admiral, sometimes from nodes 11 to 15. The dry seed is a little larger, about 550 seeds per 100 g (154 to an ounce). Green Admiral, as submitted for the trials conducted by the writers, seems not so uniform in several characters as Admiral. Selections made from Green Admiral are being introduced. These are earlier and more uniform. Green Admiral and these newer selections have about retired Admiral from canners' use. In predicting the permanence of these varieties it is well to remember that the green color of these peas tends to hide careless work in ordering the crops into the factory. It may thus happen that under stern competition they will not be very permanent.

The plant when maturing to full ripeness shows leaves which, when dry, retain their green color, while those of all the other varieties here described become yellow.

In considering Green Admiral and its parent variety, it is of interest to note their distinctness, their hardiness, and their primitive characters. In our collection of varieties from European and Asiatic Russia we have found types quite similar in growth, pod, and seed to Admiral. Whether these stocks are descended from Admiral (Fairbeard's Nonpareil) cannot be determined with certainty. There is a probability, however, that they represent the original type of wrinkled peas, in which case they would be older than the period when Thomas Andrew Knight by his hybridizations brought wrinkled peas into the ken of the horticulturists of western Europe.

In height, season, habit of growth, size of pods, size of seeds, and size and shape of leaves they resemble very closely some varieties of peas grown for dry seed. These are called field peas in the United States. In this use of the term the Admiral peas are field peas in all but the wrinkling of their seeds.

FIGURE 4.—Green Admiral. $\times \frac{1}{4}$.

SURPRISE

BRIEF CHARACTERIZATION

Surprise is very much like Alaska (Earliest of All) in season and in plant characters. It is a very early wrinkled-seeded pea.

It produces a straight stem about 30 inches high with short, straight, blunt-ended pods. The seeds are wrinkled, green, and of very good quality.

Surprise is used for home market and for canning.

ADAPTABILITY AND USE

Surprise can be grown almost as widely as Alaska, its earliness allowing it to take advantage of a very short season of cool growing weather. Surprise has



FIGURE 5.—Surprise. $\times \frac{1}{4}$.

been used for home gardens, but its predominant use has been for canning. It would have driven Alaska off the market long ago by its higher quality except that it is more exacting in its soil and cultural requirements. It requires the best soil, good culture, and

heavy seeding to insure satisfactory crops. It is probable, however, that the increasing competition of fresh peas shipped under constantly improving transportation and cooling practice in late winter and early spring will soon compel greater attention to this variety for canning.

SEASON

Surprise is an early variety coming into use almost as early as Alaska. At Sturgeon Bay, Wis., from early May planting it was ready to use in 64 days.

PLANT

(Fig. 5)

Stem slender, 4 mm (one eighth inch) in diameter, straight, light green, very rarely branched, having 15 nodes, and bearing pods from the ninth to the fourteenth, inclusive. Height about 75 cm (30 inches); each internode averages 5 cm (2 inches), the longest being 12 cm ($4\frac{3}{4}$ inches).

LEAVES

Leaves medium (22 F 7) green, with 1 pair of leaflets up to the ninth or tenth node. There are never more than 2 pairs of leaflets and 2 pairs of side tendrils. At the tenth node the length of the rachis is about 14 cm ($5\frac{1}{2}$ inches). The leaflets are elliptical, acute at the tip, often mucronate, and the margins are smooth. The leaflets measure approximately 38 mm by 23 mm ($1\frac{1}{2}$ by 1 inch) for the first pair and 60 percent as long and 60 percent as broad for the second pair. They show slight marbling.

The stipules at the tenth node are flat, acute at tip, often mucronate, and are 35 mm ($1\frac{3}{8}$ inches) long by 23 mm (1 inch) broad. The lobe extends 30 percent of the length of the stipule below its attachment and is dentate. The upper margin of the stipule is smooth. The stipules show abundant marbling.

BLOSSOMS

(Fig. 2)

The blossoms are drooping, carried one to the peduncle, which is about $2\frac{1}{2}$ cm (1 inch) long. The

standard is 21 mm (three fourths inch) by 30 mm ($1\frac{1}{8}$ inches); the wings are 17 by 13 mm ($\frac{5}{8}$ by $\frac{1}{2}$ inch); and the keel is 13 mm (one half inch) long.

PODS

(Pl. 2 and fig. 3)

The pods at table stage are medium green (19 G 6 a little yellow), about 6 cm ($2\frac{3}{8}$ inches) long by 13 mm (one half inch) broad; long, straight, square ended, with medium-size tip. The mature peduncle varies from 3 to 8 cm ($1\frac{1}{4}$ to $3\frac{1}{8}$ inches) long. The mature pods are round in cross section and bear 6 to 7 ovules, ripening 5 to 7 seeds.

PEAS

(Pl. 3)

Peas at table stage are small, 10 by 9 by 8 mm ($\frac{3}{8}$ by $\frac{3}{8}$ by $\frac{1}{4}$ inch), and green in color. When dry, they are green in color, drum-shaped, wrinkled, and there are about 470 peas per 100 g (134 per ounce).

HISTORY

Surprise was produced in 1889 by F. H. Horsford, of Charlotte, Vt., being a cross between Alaska (Earliest of All) and American Wonder. It was introduced by J. J. H. Gregory, of Marblehead, Mass., in 1897. The same cross was made in 1883 by E. S. Goff at the New York Agricultural Experiment Station, Geneva, and was named Station. Station and Surprise were very similar. They were separately listed for some time by seedsmen, but Station has either been blended with Surprise or lost.

In recent years wrinkled peas with practically all the good qualities of Surprise and without its weak constitution have been evolved by American seedsmen and experiment-station workers. They have come from crossing Surprise back on Alaska or from selections from Surprise. Some of these new strains show distinct promise.

WORLD RECORD

BRIEF CHARACTERIZATION

Reputed to be the earliest wrinkled sort, much like Gradus and Thomas Laxton in season and usefulness.

Its stems are slender, straight, unbranched, with large, almost straight, pointed pods carried one to the peduncle. These pods bear 7 to 9 large, closely wrinkled peas usually yellow when ripe.



FIGURE 6.—World Record. $\times \frac{1}{4}$.

ADAPTABILITY AND USE

World Record, with the other two varieties of the early wrinkled straight-stemmed peas, can be grown over all the United States. It has always been grown as a home-garden variety or for nearby market. It does not have a very strong constitution and has shown rather weak growth in the cultures here reported. Its apparent claim to popularity is its earliness and the large size and good quality of its peas.

SEASON

World Record is an early variety ripening shortly after Alaska. From early May planting at Sturgeon Bay, Wis., it reached table stage in 62 days.

PLANT

(Fig. 6)

Stem slender, 4 mm (one-eighth inch) in diameter, straight, unbranched, comprising 13 nodes, bearing pods on nodes 9 to 12, inclusive. Height 60 to 70 cm (24 to 28 inches). Average internode 4.6 cm ($1\frac{3}{4}$ inches). Longest internode 8.5 cm ($3\frac{3}{8}$ inches).

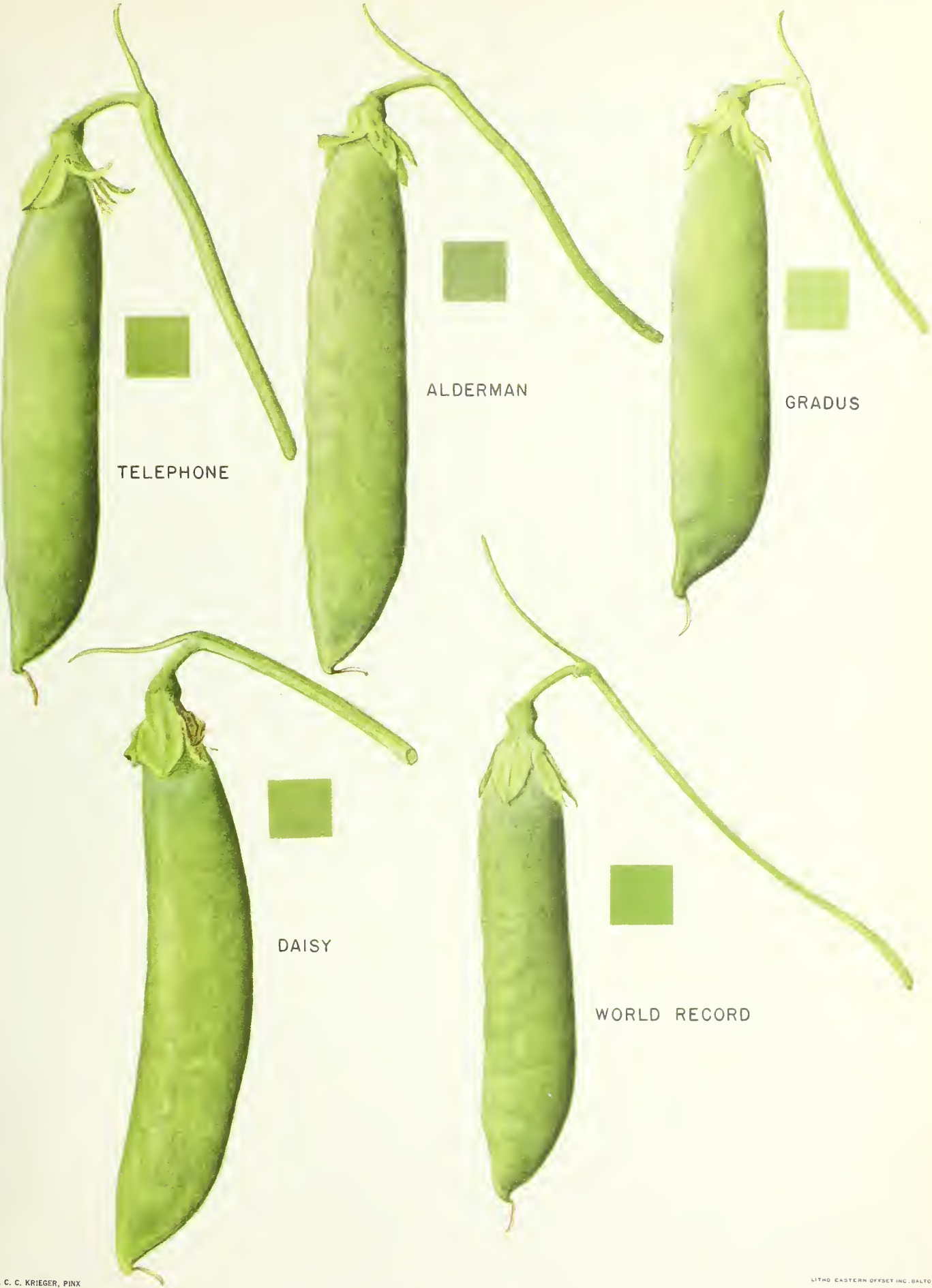
LEAVES

Leaves medium (22 J 6) green, with 1 pair of leaflets up to node 9 or 10. There are 2 pairs of leaflets and 2 pairs of side tendrils, at the eleventh node the length of the rachis is 12 cm ($4\frac{3}{4}$ inches). The leaflets are ovate, obtuse at tip, with smooth margins. The first pair of leaflets measure about 40 mm ($1\frac{5}{8}$ inches) long by 33 mm ($1\frac{1}{4}$ inches) broad, and the second pair are 87 percent as long by 85 percent as broad. They show slight marbling. Stipules are flat, obtuse at tip and at the eleventh node are 45 mm ($1\frac{3}{4}$ inches) long by 33 mm ($1\frac{1}{4}$ inches) broad. The lobe extends 32 percent of the length of the stipule below its attachment. The stipules are abundantly marbled.

BLOSSOMS

(Fig. 7)

Blossoms are drooping, carried one to the peduncle, which is about 2.5 cm (1 inch) long. The standard



TELEPHONE

ALDERMAN

GRADUS

DAISY

WORLD RECORD

is 22 mm (seven eighths inch) long by 27 mm (1 inch) broad; the wings are 19 mm by 17 mm ($\frac{3}{4}$ by $\frac{5}{8}$ inch); the keel is 13 mm (one half inch) long.

PODS

(Pl. 4 and fig. 8)

The pods are medium green (20 L 7, a little paler and yellower). The pods are about 9 cm ($3\frac{1}{2}$ inches) long by 16 mm (five eighths inch) broad. They are

PEAS

(Pl. 3)

Peas at table stage are 13 by 10 by 8 mm ($\frac{1}{2}$ by $\frac{3}{8}$ by $\frac{1}{4}$ inch). When dry they are elongated, flat, wrinkled, yellow. There are about 290 peas per 100 g (81 to the ounce).

HISTORY

World Record was produced by Sutton & Sons, Reading, England. It was introduced in 1907, and their first catalog description says: "This new variety

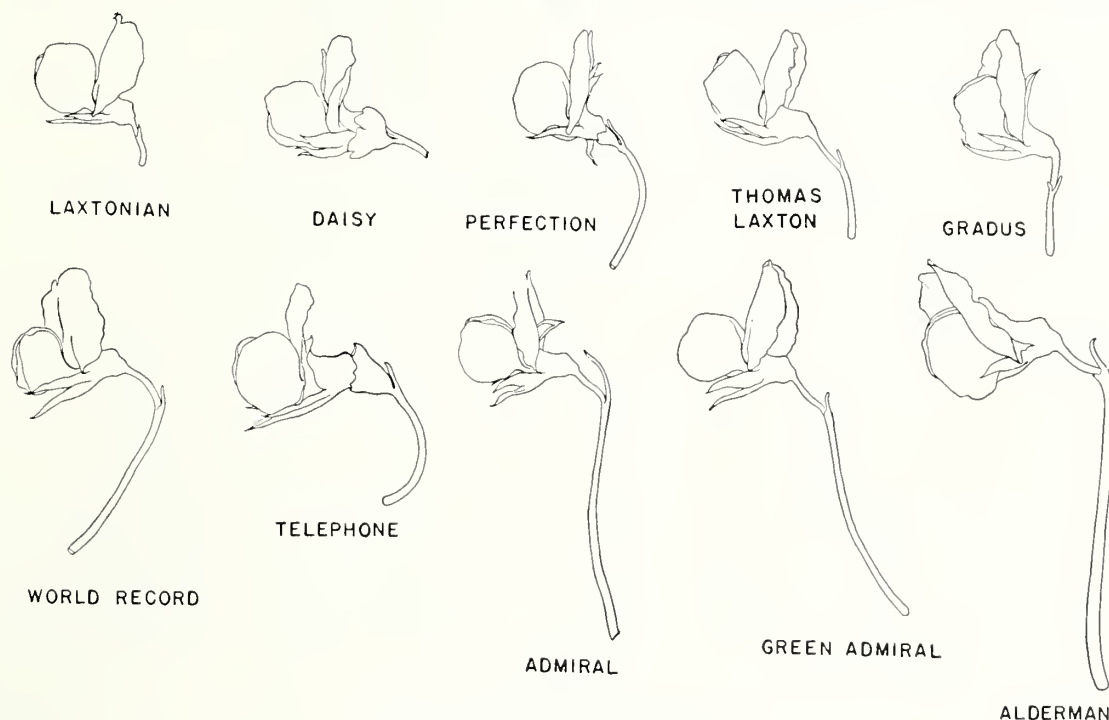


FIGURE 7.—Expanded blossoms. Natural size.

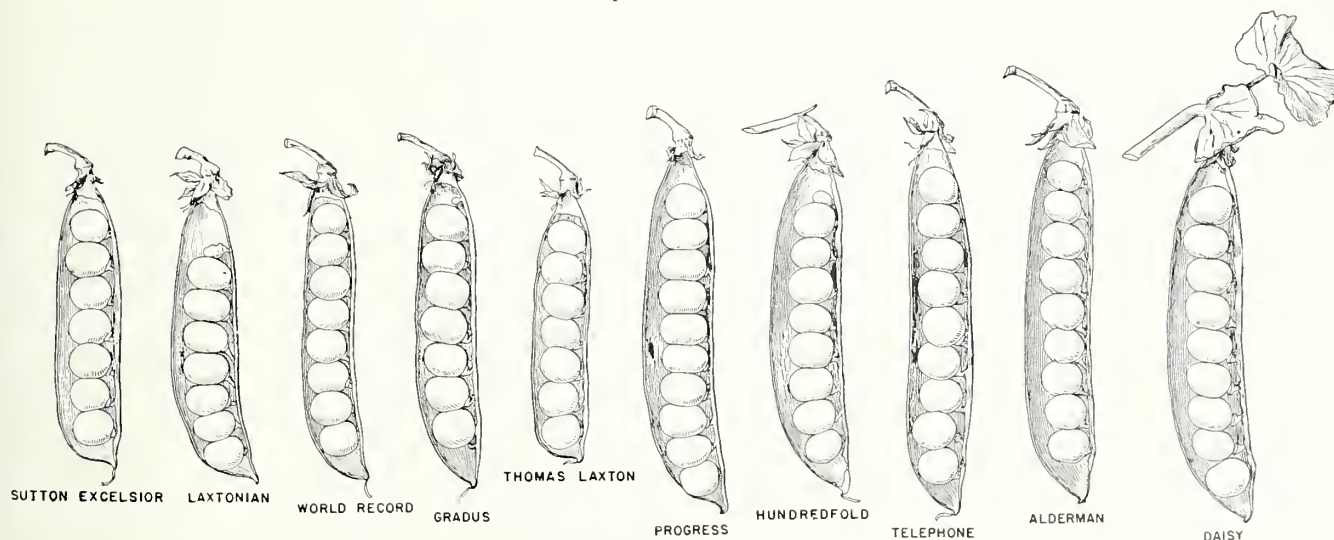


FIGURE 8.—Pod outlines. $\times \frac{7}{10}$.

straight, pointed, with a small tip. The mature peduncle measures from 2 to 5 cm ($\frac{3}{4}$ to 2 inches). The pods are round in cross section and contain 7 to 9 ovules, ripening 5 to 8 seeds.

was obtained from a cross between Sutton's Harbinger and Sutton's Early Giant." It was soon on sale by American seedsmen, and has taken a place of minor importance in the American home and market gardens.

GRADUS

BRIEF CHARACTERIZATION

The oldest variety to combine large pods and earliness. Its usefulness has been for the home garden and nearby market.

It has a straight, slender stem about 30 inches high and bears large pods with pointed ends, almost straight. Ripe seeds are large, wrinkled, and usually yellow in color.

Its earliness and its large pods have made it a very popular variety for many years.

ADAPTABILITY AND USE

The season of Gradus is short enough to enable it to reach maturity in the cool weather of early spring.



FIGURE 9.—Gradus. $\times \frac{1}{4}$.

To this most valuable character it adds the attractiveness of large pods and large seeds, and the high quality which goes with wrinkled seeds.

The medium height and earliness of Gradus would fit it for canning machinery, but in the past the large size of its peas has been regarded as making it unsuitable for canners' use.

It has been popular in all parts of the United States for home-garden use, and has also been popular for nearby market, and to some extent for long shipment.

SEASON

Early, very shortly after Alaska. Planted at Sturgeon Bay, Wis., the first week of May, it was ready for table in 63 days.

PLANT

(Pl. 5 and fig. 9)

Stem slender, 4 mm (one eighth inch) in diameter, straight, unbranched, comprising 13 nodes and bearing pods on nodes 8 to 12, inclusive. Height 70 to 75 cm (28 to 30 inches). Average internode 5.4 cm ($2\frac{1}{8}$ inches); longest internode 9.5 cm ($3\frac{3}{4}$ inches).

LEAVES

Leaves light green (21 L 7 a little yellower), with 1 pair of leaflets up to the ninth or tenth node. Leaves with 2 pairs of leaflets and 3 pairs of side tendrils. At the twelfth node the length of the rachis is about 17 cm ($6\frac{3}{4}$ inches). The leaflets are ovate, obtuse at tip, with smooth margins. They measure approximately 46 mm ($1\frac{3}{4}$ inches) long by 39 mm ($1\frac{1}{2}$ inches) broad for the first pair and 63 percent as long by 66 percent as broad for the second pair. They are moderately marbled. Stipules are flat, acute at tip, and at the twelfth node are 54 mm ($2\frac{1}{8}$ inches) long by 43 mm ($1\frac{3}{4}$ inches) broad. The lobe extends 33 percent of the length of the stipule below its attachment and has a dentate margin. The stipules are abundantly marbled.

BLOSSOMS

(Fig. 7)

Blossoms are drooping, carried one to the peduncle, which is 3 cm ($1\frac{1}{8}$ inches) long. The standard is 27 mm (1 inch) long by 32 mm ($1\frac{1}{4}$ inches) wide; the wings are 22 mm by 17 mm ($\frac{7}{8}$ by $\frac{5}{8}$ inch); the keel is 14 mm (one half inch) long.



L. C. C. KRIEGER, PINX

LITHO EASTERN OFFSET INC. BALTO

A plant of Gradus showing a typical light-green foliated variety. $\times \frac{3}{4}$.

PODS

(Pl. 4 and fig. 8)

Pods are light green (19 I 6), 9 cm ($3\frac{1}{2}$ inches) long by 18 mm (three fourths inch) broad. They are straight, pointed at the end with a large tip. The mature peduncles measure from 2 to 7 cm ($\frac{3}{4}$ to $2\frac{3}{4}$ inches). The pods are round in cross section and contain 7 to 9 ovules, ripening 5 to 8 seeds.

PEAS

(Pl. 3)

Peas at table stage measure 13 by 9 by 10 mm ($\frac{1}{2}$ by $\frac{3}{8}$ by $\frac{3}{8}$ inch). When dry they are elongated, flat, wrinkled, and yellow in color. There are about 300 peas per 100 g (84 to the ounce).

HISTORY

Gradus was produced by Thomas Laxton, of Bedford, England, and was first sold in 1887. Its parentage was Alaska (Earliest of All) pollinated by Duke of Albany. It was the first variety to combine the wrinkled seeds and the large pods of the Telegraph type of peas with the earliness and medium height of

the extra-early type and was thus the prototype of a numerous and increasing group. The importance of this group is shown by the fact that this publication contains three of its varieties, Gradus, Thomas Laxton, and World Record.

Gradus was first sold in the United States by Peter Henderson, 10 years after its introduction, in 1897. It was renamed Prosperity, and that name has continued in use to a small extent. It has been a very popular pea and is early enough to be grown in all parts of our country. The original height of Gradus was slightly more than that of Alaska, but because of mechanical mixture and genetic disturbance the variety has become very much mixed, and apparently is not readily restored to its original status. Strains called Improved Gradus and Late Gradus have been introduced, both being taller, later, and with longer peduncles than are proper for true Gradus. Attempts to rectify this condition through selection show that many plant progenies retain a continuing mixture. Doubtless this difficulty in purchasing satisfactory stocks of Gradus will soon retire it in favor of some of its newer and more uniform successors.

THOMAS LAXTON

BRIEF CHARACTERIZATION

Probably the second in importance in the list of peas here described. It is almost as early as Alaska and somewhat taller.

Its stem is slender, straight, about 36 inches high, unbranched, with large, straight, square-ended pods with from 7 to 9 seeds. These when ripe are very closely wrinkled, usually yellow, though in some conditions of ripening they remain green.

ADAPTABILITY AND USE

The Thomas Laxton variety is suited to the whole range of the United States. It is often ranked as highest in quality of all table peas, though quality in peas is a character as yet incapable of exact definition. It is the premier home-garden variety and is grown largely for nearby market, but also for long-distance shipment. Of recent years it has been canned experimentally, and there are indications that it may become important as a canning pea. Its earliness and height of vine would fit it very well for canning requirements. It thus becomes more nearly a general-purpose pea than any other wrinkled variety.

SEASON

Early, only a few days after Alaska. At Sturgeon Bay, Wis., it is ready for use in 63 days from early May planting.

PLANT

(Fig. 10)

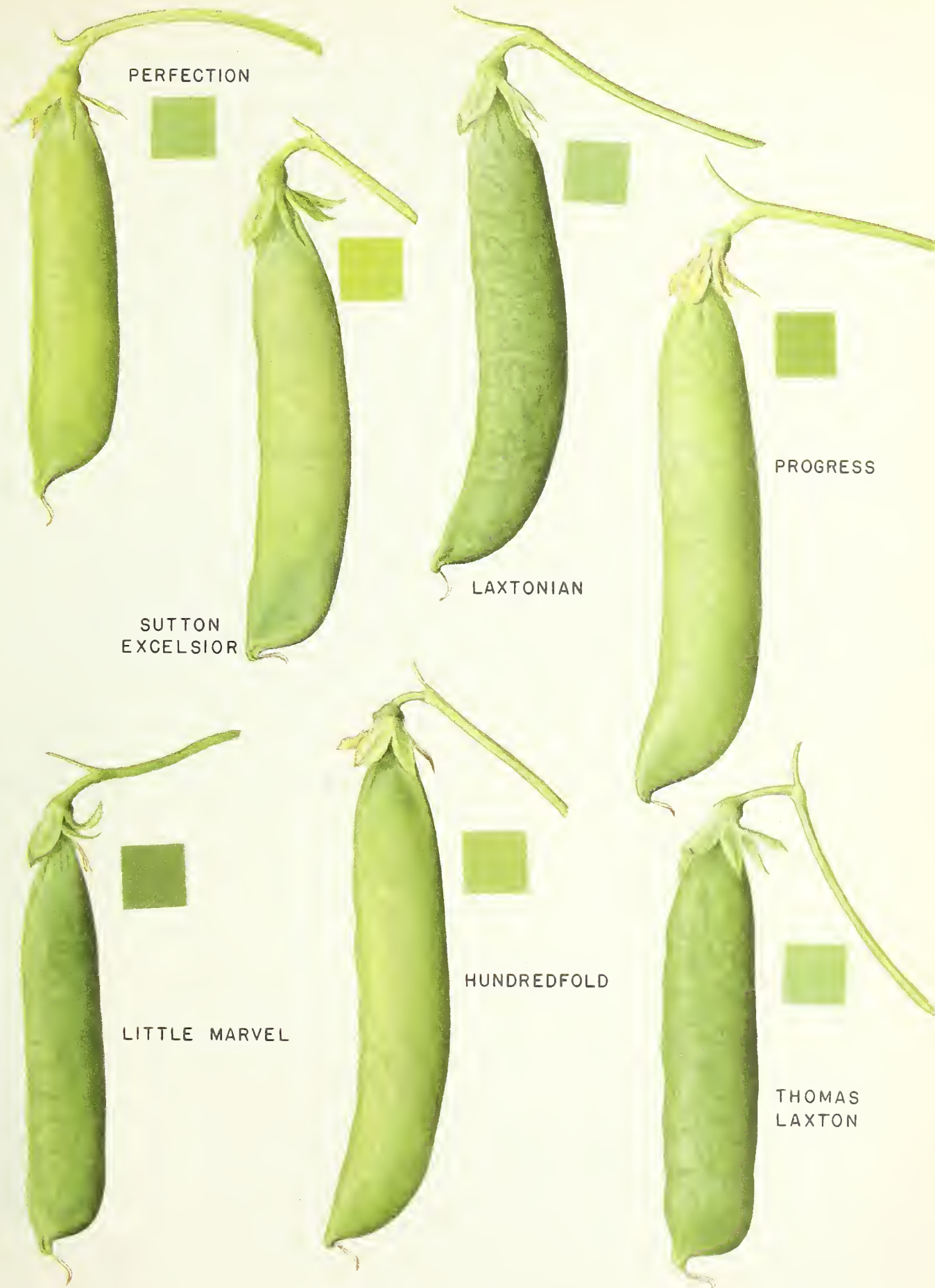
Stem slender, 4 mm (one eighth inch) in diameter, straight, unbranched, comprising 16 to 20 nodes, and bearing pods on nodes 12 to 18, inclusive. Height 80 cm (32 inches). Average length of internodes 4 cm (1½ inches). Longest internode 9.5 cm (3¾ inches).

LEAVES

Leaves medium green (22 K 6), with 1 pair of leaflets up to node 11 or 12. Leaves with 2 pairs of leaflets and 3 pairs of side tendrils. At the seventeenth node the rachis is about 16 cm (6¼ inches) long. The leaflets are ovate, obtuse at tip, with smooth margins. The first pair of leaflets measure approximately 50 mm (2 inches) long by 41 mm (1½ inches) broad; the second are about 70 percent as long by 75 percent as broad. They show slight marbling. Stipules are flat, with acute tip; at the seventeenth node they are 56 mm (2¼ inches) long by 41 mm (1½ inches) broad. The lobe extends 36 percent the length of the stipule below its attachment and has a dentate margin. Stipules are abundantly marbled.



FIGURE 10.—Thomas Laxton. $\times \frac{1}{4}$.



BLOSSOMS

(Fig. 7)

Blossoms are erect, carried one to the peduncle, which is 3.5 cm ($1\frac{3}{8}$ inches) long. The standard is 27 mm (1 inch) long by 28 mm ($1\frac{1}{8}$ inches) broad; the wings are 22 by 16 mm ($\frac{7}{8}$ by $\frac{5}{8}$ inch); the keel is 13 mm (one half inch) long.

PODS

(Pl. 6 and fig. 8)

The pods (fig. 8) are about 8 cm ($3\frac{1}{8}$ inches) long by 18 mm (three fourths inch) broad. They are dark green, a little paler than 22 I 5; straight, square-ended, with a fairly large tip. The mature peduncles measure from 2 to 8 cm ($\frac{3}{4}$ to $3\frac{1}{8}$ inches). The pods are round in cross section, and contain 7 to 9 ovules, ripening 5 to 8 seeds.

PEAS

(Pl. 3)

Peas at table stage measure 12 by 9 by 9 mm ($\frac{1}{2}$ by $\frac{3}{8}$ by $\frac{3}{8}$ inch). When dry they are elongated, flat, finely wrinkled, usually yellow, though green under some growth conditions. There are about 350 seeds per 100 g (98 in an ounce).

HISTORY

Thomas Laxton was introduced in 1898 by the veteran pea breeder whose name it bears. It is derived from Gradus pollinated by a very early seedling of Alaska (Earliest of All). The variety has thus two infusions of Alaska blood, since Alaska is one of the parents of Gradus.

It was brought to the United States in 1900 and has continuously grown in favor.

ADMIRAL

BRIEF CHARACTERIZATION

In many ways the most distinct variety on our list, and the one with the longest history.

The dry seeds of the Admiral are the smallest of any variety discussed here. The plant is strong-growing, medium season, about 3 to 4 feet high, often branched, and bears small straight blunt-ended pods. The seeds are small, wrinkled, and yellow when ripe. The plant is hardy and shows considerable disease resistance.

ADAPTABILITY AND USE

Admiral may be grown over most of the United States. It has never been a very popular home-garden variety, however, partly because of its long vines. The pods are too small for a popular market pea. Its greatest use has been for canning, for which purpose it is probably planted more widely over the world than any other variety.

Its hardiness also permits it to be planted as a field pea occasionally. This variety and the Alaska are the only peas here described which are so used. Since both of these varieties are most largely used for canning, the fact that they are grown as field peas often has disastrous effects in seed handling. In seasons of short seed supply there is danger that poorly selected or mixed seed from these field crops will be sold to canners for planting. In the past considerable loss has been suffered by canners from the purchase of such seed.

Admiral produces a sort of rogue not found in the other peas described in this publication. It is often called by seedsmen the "early flowering rogue". It begins flowering at lower nodes than the true variety and continues to flower through a larger number of nodes than normal plants. The presence of this aberrant type in a canning crop has a disastrous effect on the uniformity of the pack, the earlier peas being fully ripe when the main lot are in the proper stage for canning.

Admiral is well adapted for poorer soils. When planted on very rich soil the plants are often too tall for good results, as the long vines add to the expense of handling.

The Admiral has been largely superseded by the Green Admiral. Both forms show considerable resistance to *Fusarium* and so can be used for land infested by this fungus.

SEASON

This variety is medium season to late in maturity. Planted in early May at Sturgeon Bay, Wis., it was ready to use in about 74 days.



FIGURE 11.—Admiral. $\times \frac{1}{4}$.

PLANT

(Fig. 11)

Stem medium slender, 5 mm (one eighth inch) in diameter, straight, green, often branching at nodes 13 and 14. It produces about 24 nodes and bears pods from the fifteenth to the twenty-second, inclusive. Height 100 to 110 cm (39 to 43 inches). Average internode 4.3 cm ($1\frac{5}{8}$ inches), longest internode 9 cm ($3\frac{1}{2}$ inches).

LEAVES

Leaves medium green (22 K 6) with 1 pair of leaflets up to the twelfth or thirteenth node, never having more than 2 pairs of leaflets and 2 pairs of of side tendrils. At the sixteenth node the length of the rachis is about 19 cm ($7\frac{1}{2}$ inches). The leaflets are elliptical, acute at the tip, with smooth margins. The leaflets are approximately 55 mm long, by 30 mm broad ($2\frac{1}{8}$ by $1\frac{1}{4}$) inches for the first pair, and 65 percent as long and 74 percent as broad for the second pair. They show no marbling.

The stipules are flat, acute at tip, often mucronate, and at the sixteenth node are 55 mm ($2\frac{1}{8}$ inches) long by 43 mm ($1\frac{3}{4}$ inches) broad. The lobe extends 30 percent of the length of the stipule below its attachment and is dentate in margin. The upper margin of the stipule is smooth. The stipules show no marbling.

BLOSSOMS

(Fig. 7)

The blossoms are erect at flowering time, carried 1 or 2 to the peduncle, which is 6 cm ($3\frac{3}{8}$ inches) long. The standard is 22 mm long by 30 mm broad ($\frac{7}{8}$ by $1\frac{1}{4}$ inches); the wings are 21 mm long by 14 mm ($\frac{7}{8}$ by $\frac{1}{2}$ inch) broad; the keel is 14 mm ($\frac{1}{2}$ inch) long.

PODS

(Pl. 2 and fig. 3)

The pods are about 7 cm ($2\frac{3}{4}$ inches) long by 13 mm (one half inch) broad; medium green (20 L 5) in color; straight, square at the end, with a small tip. The mature peduncle is about 5.5 to 9 cm ($2\frac{1}{8}$ to $3\frac{1}{2}$ inches) long. The mature pods are round in cross section and contain 7 to 9 ovules and ripen 6 to 8 seeds.

PEAS

(Pl. 3)

Well developed, small, 11 by 9 by 6 mm ($\frac{1}{2}$ by $\frac{3}{8}$ by $\frac{1}{4}$ inch) at canning stage, green in color. When dry they are yellow, drum-shaped, and wrinkled. There are about 575 peas per 100 g (161 to the ounce).

HISTORY

This is the oldest variety among those described here. It was introduced by William Fairbeard, of England, in 1853. He named it Fairbeard's Nonpareil. Under this name the variety was sold in the United States to only a slight extent, so far as American catalog records show. It is even now listed under this name, however, in some Dutch catalogs. The parents of Nonpareil are unknown to the writers, but Fairbeard, who also originated Champion of England, had only a few wrinkled varieties with which to work. These were largely the product of the breeding work of Thomas Andrew Knight, and were called Knight's Marrows. Nonpareil was, when introduced, entitled to the term dwarf in comparison with other wrinkled peas then in existence. It was also earlier than other wrinkled sorts.

Sometime in the decade 1870-80 Haage und Schmidt, seedsmen of Erfurt, Germany, introduced a variety which they named Admiral Greigh. They listed this name in their 1932 catalog, though they say in a recent letter they do not know the origin of the variety, nor anything about the admiral for whom the pea was named. This pea is, however, Fairbeard's Nonpareil. In the early nineties, Peter Henderson, of New York, conducted a pea-variety trial under the direction of Alexander Forbes, who had but recently been employed by Henderson. In ordering for this trial this pea was secured from Haage und Schmidt. As a result of this trial Admiral Greigh was retained as productive, hardy, and promising, and the admiral's name was dropped as being difficult of pronunciation by English-speaking customers. The whole stock was finally sold to D. M. Ferry, of Detroit, Mich., who started it on its canning career in the United States.

It has been renamed Champion of Scotland in England. Also in English and in continental seed catalogs the name "Canning pea" is not infrequently found. However, wherever the writers have secured peas under this name they have proved to be Fairbeard's Nonpareil.

TELEPHONE

BRIEF CHARACTERIZATION

The most popular name for tall late peas in the United States.

The plant is about 4 feet high and produces long, almost straight pods with pointed ends. The peas are large and when dry are flat, wrinkled, and green to yellow in color.



FIGURE 12.—Telephone. $\times \frac{1}{4}$.

ADAPTABILITY AND USE

Telephone is a home-garden and a shipping pea. The length of vine, however, tends to restrict its use as a shipping pea. While it can be grown over most of the United States, yet it is most popular in the North where the growing season is suitable in length.

SEASON

For the United States, a late variety. Planted at Sturgeon Bay, Wis., early in May, it reached table stage in 73 days.

PLANT

(Fig. 12)

Stem medium heavy, 5 mm (one fourth inch) in diameter; straight, unbranched, comprising 20 nodes, and bearing pods at nodes 14 to 19, inclusive. Height 110 to 120 cm (43 to 47 inches). Average internode 5.5 cm ($2\frac{1}{8}$ inches). Longest internode, 11 cm ($4\frac{3}{8}$ inches).

LEAVES

Leaves light green (21 L 7 and yellowish), with 1 pair of leaflets up to the eleventh or twelfth node. There are 2 pairs of leaflets and 3 pairs of side tendrils. At the fifteenth node the rachis is about 20 cm (8 inches) long. The leaflets are ovate, obtuse at tip, with smooth margins. The first pair of leaflets are approximately 62 mm ($2\frac{3}{8}$ inches) long by 50 mm (2 inches) broad, the second pair are 73 percent as long by 64 percent as broad. They are slightly marbled. Stipules are wavy, obtuse at tip, and at the fifteenth node are 60 mm ($2\frac{3}{8}$ inches) long by 55 mm ($2\frac{1}{8}$ inches) broad. The lobe extends 33 percent of the length of the stipule below its attachment and is dentate in the margin. The stipules are abundantly marbled.

BLOSSOMS

(Fig. 7)

Blossoms are drooping, carried one to the peduncle, which is about 4 cm ($1\frac{5}{8}$ inches) long. The standard is 27 mm (1 inch) long by 34 mm ($1\frac{3}{8}$ inches) broad; the wings are 23 mm by 18 mm (1 by $\frac{3}{4}$ inch); the keel is 15 mm (five eighths inch) long.

PODS

(Pl. 4 and fig. 8)

The pods are light green (20 J 6); about 10 cm (4 inches) long by 18 mm (three fourths inch) broad.

They are straight, pointed, with a small tip. The mature peduncles measure from 4 to 9 cm ($1\frac{1}{2}$ to $3\frac{1}{2}$ inches). The pods are round in cross section and contain 7 to 10 ovules, ripening 5 to 9 seeds.

PEAS

(Pl. 3)

Peas at table stage measure 12 by 10 by 8 mm ($\frac{1}{2}$ by $\frac{3}{8}$ by $\frac{1}{4}$ inch). When dry, they are square, indented to wrinkled, green to yellow. There are about 300 peas per 100 g (84 to the ounce).

HISTORY

Telephone was introduced by Carter of London, England, in 1878. It was a selection of Telegraph,

which is a variety with much less wrinkling in the dry seeds. It soon was brought to the United States. The light color of the pods was popular at the time the variety was introduced, but with the change of preference to darker pods there has been so much substitution that a large share of the peas sold as Telephone are of some long-vined, dark-podded variety, usually Alderman. There are probably market gardeners who would feel aggrieved if they got Telephone when they order it, and who believe that Alderman is Telephone. Telephone was the first tall, large-podded wrinkled pea and has tended to supplant Champion of England.

ALDERMAN

BRIEF CHARACTERIZATION

A late, tall, large-podded variety. The plants are straight, about 5 feet high, and produce dark-green, long, pointed pods. The peas are large at table stage; when dry are square to flat, wrinkled, and green to yellow.



FIGURE 13.—Alderman. $\times \frac{1}{4}$.

ADAPTABILITY AND USE

The Alderman variety is too late for extensive use for the South. It is mainly a home-garden variety but has sometimes been used for market gardening. The long vines are a disadvantage for market-garden purposes, except in the districts where trellises are used. The thickness of the pod wall and the dark-green color of the pods make a good trucking pea of the Alderman when supports can be given.

SEASON

For the United States, a late variety. Planted at Sturgeon Bay, Wis., early in May, it reached table stage in 76 days.

PLANT

(Fig. 13)

Stem heavy, 7 mm in diameter; straight, unbranched, comprising 25 nodes, bearing pods at nodes 16 to 23, inclusive. Height 140 to 150 cm (55 to 59 inches). Average internode 5.8 cm ($2\frac{1}{4}$ inches). Longest internode 11.5 cm ($4\frac{1}{2}$ inches).

LEAVES

Leaves medium green (21 G 7, a little yellow), with 1 pair of leaflets up to node 13 or 14. Leaves with 2 pairs leaflets and 3 pairs side tendrils. At the fifteenth node the rachis is 17 cm ($6\frac{3}{4}$ inches) long. The leaflets are ovate, obtuse at the tip, with smooth margins. The first pair of leaflets are about 53 mm ($2\frac{1}{2}$ inches) long by 47 mm ($1\frac{3}{4}$ inches) broad; the second pair are 83 percent as long by 80 percent as broad. They are slightly marbled. Stipules are wavy, acute at the tip, and at the fifteenth node measure approximately 66 mm ($2\frac{5}{8}$ inches) long by 61 mm ($2\frac{3}{8}$ inches) broad. The lobe extends 32 percent of the length of the stipule below its attachment and is dentate in margin. The stipules are abundantly marbled.

BLOSSOMS

(Fig. 7)

Blossoms are drooping, carried 1 or 2 on the peduncle, which is 7.5 cm (3 inches) long. The standard is 30 mm ($1\frac{1}{8}$ inches) long by 40 mm ($1\frac{5}{8}$ inches) broad; the wings are 26 mm (1 inch) by 20 mm (three-fourths inch); the keel is 16 mm (five eighths inch) long.

PODS

(Pl. 4 and fig. 8)

The pods are medium green (20 K 5) and about 10.5 cm ($4\frac{1}{8}$ inches) long by 18 mm (three fourths inch)

broad. They are straight, pointed, with a small tip. The mature peduncles measure 4 to 9 cm ($1\frac{5}{8}$ to $3\frac{1}{2}$ inches). The pods are round in cross section and contain 7 to 10 ovules, ripening 5 to 9 seeds.

PEAS

(Pl. 3)

Peas at table stage measure 13 by 11 by 10 mm ($\frac{1}{2}$ by $\frac{3}{8}$ by $\frac{3}{8}$ inch). When dry they are square to

flat, wrinkled, and green to yellow. There are about 310 peas per 100 g (87 to the ounce).

HISTORY

Alderman was originated by Thomas Laxton, of Bedford, England, and was introduced by him in 1892. It was produced by crossing two unnamed seedlings. It has almost displaced Telephone in the United States. It is often sold as Dark-Podded Telephone but probably more often simply as Telephone, with no apologies.

LITTLE GEM

BRIEF CHARACTERIZATION

A dwarf, small-podded, early variety. The stems are zigzag, about 18 inches high with small, straight, blunt-ended pods. Peas are fairly large at table stage and very tightly crowded in the pods. When dry they are drum-shaped, wrinkled, and green, with occasional yellow seeds.

ADAPTABILITY AND USE

Little Gem peas can be grown in any part of the United States where peas can be produced and are probably grown farther south than most wrinkled varieties. It is a home-garden variety. It has been used in the past for market but has been superseded by larger-podded, more recent sorts. It has been used to a considerable extent for canning, and forms a very fine product. The short vines, however, make it



FIGURE 14.—Little Gem. $\times \frac{1}{4}$.

unsuitable to any but the better soils with good culture. It is not much used at present for canning.

It persists out of the past for home-garden use because of its high quality, hardiness, and productiveness.

SEASON

The Little Gem variety is early, coming into use about 4 days after Alaska. It is ready for the table at Sturgeon Bay, Wis., from early May planting, in about 66 days.

PLANT

(Fig. 14)

Stem slender, 4 mm (one eighth inch) diameter, zigzag, 40 to 45 cm (16 to 18 inches) tall, often showing branches at nodes 1, 2, 10, and 11. The plant produces about 16 nodes and carries pods on nodes 12 to 16, inclusive. The average length of the internode is $2\frac{1}{2}$ cm (1 inch), the longest internode being $6\frac{1}{2}$ cm ($2\frac{1}{2}$ inches).

LEAVES

Leaves medium green (22 K 6) with 1 pair of leaflets to the tenth or eleventh node. Leaflets do not exceed 2 pairs, with 2 pairs of lateral tendrils. The length of the rachis at the thirteenth node is about 14 cm ($5\frac{1}{2}$ inches). The leaflets are ovate, obtuse at the tip, and the margins are smooth to serrate. They measure approximately 44 by 33 mm ($1\frac{3}{4}$ by $1\frac{3}{8}$ inches) for the first pair and 75 percent as long by 85 percent as broad for the second pair. They show slight marbling.

Stipules at the thirteenth node are acute at the tip, sometimes mucronate, flat, 45 mm long ($1\frac{3}{4}$ inches) by 38 mm ($1\frac{1}{2}$ inches) wide. The lobe extends 84 percent of the length of the stipule below its attachment and has a dentate margin. The upper margin of the stipule is smooth. They are abundantly marbled.

BLOSSOMS

(Fig. 2)

The blossoms are drooping, carried singly or in pairs on peduncles about $1\frac{1}{2}$ cm (five eighths inch) long at flowering time. The standard measures about 18 mm (three fourths inch) long by 24 mm (1 inch) broad; the wings are 18 mm (three fourths inch) by 13 mm (one half inch); the keel is 12 mm long (one half inch).

PODS

(Pl. 2 and fig. 3)

The pods are medium green (20 K 4), about $6\frac{1}{2}$ cm ($2\frac{1}{2}$ inches) long by 13 mm (one half inch) broad; straight, square at the end with a fairly large tip. When the peas are full-grown they sometimes show by swelling the pod. The mature peduncles are 4 to 5 mm (about one eighth inch) in length. The pods contain 7 to 9 ovules and ripen 5 to 8 seeds.

PEAS

(Pl. 3)

Well-developed peas at canning time are fairly large, very crowded in the pod, 13 by 9 by 11 mm ($\frac{1}{2}$ by $\frac{3}{8}$ by $\frac{3}{8}$ inch). When dry they are drum-shaped, wrinkled, and green, with occasional yellowish peas. There are about 460 peas per 100 g (129 to the ounce).

HISTORY

Little Gem was produced by Dr. McLean, of Colchester, England, and was introduced by Turner, an English seedsman, in 1862. It was the first dwarf wrinkled pea and has been used in breeding many of the present-day varieties.

Very little is known of the details of Dr. McLean's work. He worked with Beck's Gem and is said to



FIGURE 15.—Nott Excelsior. $\times \frac{1}{4}$.

have crossed on it most of the wrinkled varieties then extant.

Beck's Gem is better known in the United States as Tom Thumb, which can yet be bought of some European seedsmen. It is a yellow, smooth, round pea of small size produced on a very dwarf, close-jointed vine. It has probably had a large share in the production of all American dwarf varieties, and through Little Gem it enters into the ancestry of at least seven peas of the present list.

Little Gem became immensely popular immediately after its introduction and in a decade or two had been selected into a number of slightly variant strains. The names of some of these still persist, but the distinguishing characters so carefully insisted upon by their introducers have been lost, and with the decreasing importance of this group of peas, it seems unlikely that seedsmen will again try to isolate and perpetuate them.

Three of these variants of Little Gem are briefly described here for their great historical interest. All the peas of the Little Gem group have had a very high reputation for table quality, and any possible revival will probably be for home gardens.

Premium Gem was introduced by Carter of London a few years before 1880. It was a larger growing Little Gem and can hardly be said to exist at present.

Nott Excelsior (figs. 2, 3, and 15, and pls. 2 and 3), introduced by Richard Nott, of Burlington, Vt., in 1891, is another strain very similar to Little Gem. Its parents were Little Gem $\times$ Advancer. From the



FIGURE 16.—Cannors Gem. $\times \frac{1}{4}$.

second-generation variants of this cross Nott selected out a type which was slightly shorter and earlier than Little Gem and was claimed to be hardier. These differences were never great, and at present the two varieties cannot be distinguished.

Another variety of this group is Cannors Gem (figs. 2, 3, and 16, and pl. 2). This was an attempt to fix some of the longer-vined variants in stocks of Little Gem that were disintegrating and was intended to give a strain with a higher productiveness. Cannors Gem as furnished by cooperating seedsmen has shown great lack of uniformity.

LITTLE MARVEL

BRIEF CHARACTERIZATION

The most recent variety of the small-podded, early, dwarf peas.

The variety has stems about 18 inches high, zigzag, often branched, producing small pods. Peas are fairly large at table stage. When ripe they are squarish, flattened in shape, and are green and yellow in color.

The variety is admitted to have high table quality.

ADAPTABILITY AND USE

Little Marvel is early enough to be grown in all parts of the United States and is an important variety in the South. It is especially valuable as a home-garden sort. Some experiments have been made in its use for canning. It closely resembles Little Gem.



FIGURE 17.—Little Marvel. $\times \frac{1}{4}$.

SEASON

An early variety. Planted at Sturgeon Bay, Wis., the first week in May, it was ready for the table in 66 days.

(Fig. 17)

PLANT

Stem medium heavy, 5 mm (one fourth inch) diameter, zigzag, sometimes branched at second and eleventh nodes, comprising 18 nodes and producing

pods from the tenth to the eighteenth nodes, inclusive. Height about 45 cm (18 inches). Average internode is 2.8 cm ($1\frac{1}{8}$ inches), the longest internode is 4.6 cm ($1\frac{3}{4}$ inches).

LEAVES

Leaves medium green (22 L 7), with one pair of leaflets to the tenth or eleventh node. There are 2 pairs of leaflets and 3 pairs of side tendrils. At the twelfth node the rachis is 16 cm ($6\frac{1}{4}$ inches) long. The leaflets are ovate, acute at tip, with a smooth margin. The leaflets of the first pair are 55 mm ($2\frac{1}{8}$ inches) by 40 mm ($1\frac{1}{2}$ inches), and those of the second pair are 63 percent as long by 80 percent as broad as the first. They show slight marbling.

The stipules are wavy, acute at the tip, and at the twelfth node are 50 mm (2 inches) long by 46 mm ($1\frac{3}{4}$ inches) broad. The lobe extends 46 percent of the length of the stipule below its point of attachment and is dentate in margin. The upper margin of stipule is smooth. The stipules are abundantly marbled.

BLOSSOMS

(Fig. 2)

The blossoms are drooping, one or two to the peduncle, which is 1.5 cm (five eighths inch) long. The standard is 20 mm (three fourths inch) long by 27 mm ($1\frac{1}{8}$ inches) broad; the wings are 18 mm by 14 mm ($\frac{1}{4}$ by $\frac{1}{2}$ inch); the keel is 13 mm (one half inch) long.

PODS

(Fig. 3 and pl. 6)

The pods are medium green (21 L 5), about 7.5 cm (3 inches) long by 13 mm (one half inch) broad; straight and almost square, with medium-sized tip. The mature peduncle is 3 to 7 cm ($1\frac{1}{4}$ to $2\frac{3}{4}$ inches) long. The pods are round in cross section and carry 7 to 9 ovules, ripening 5 to 8 seeds.

PEAS

(Pl. 3)

The peas are large at table stage, 13 by 11 by 7 mm ($\frac{1}{2}$ by $\frac{3}{8}$ by $\frac{1}{4}$ inch). The ripe seeds are squarish, flattened, green and yellow, and well wrinkled.

About 400 peas weigh 100 grams (112 to the ounce). All stocks studied have shown a tendency to produce

ripe peas with split seed coat, sometimes as much as 11 percent of the sample showing this character.

HISTORY

Little Marvel was introduced by Sutton & Sons, Reading, England, in 1900. It was first sold in the United States by J. J. H. Gregory, in 1908. Gregory gave its parentage as William Hurst, pollinated by

Daisy. This does not seem a probable parentage, and Suttons have denied in a recent letter that this was the true ancestry. They state that the parents of Little Marvel are Chelsea Gem and Sutton's A-1. Neither of these varieties is in the American trade at present. Chelsea Gem would fit into the small-podded, late peas with zigzag stems, and A-1 in the large-podded, early, straight-stemmed group.

HUNDREDFOLD

BRIEF CHARACTERIZATION

Hundredfold, with Laxtonian and Progress, belongs to the dwarf early large-podded group.

The plants are about 18 inches high with zigzag stems, bearing large, slightly curved pods with pointed ends. The peas are large, and when dry are flat, wrinkled, and yellow to greenish.

ADAPTABILITY AND USE

Hundredfold could be grown in most parts of the United States but is mainly popular in the North.

It has a zigzag stem about 18 inches high and bears long, slightly curved pods with pointed ends. The seeds are large, and when dry are flat, wrinkled, and yellow to greenish in color.

SEASON

An early variety, a few days later than Alaska. Planted in early May at Sturgeon Bay, Wis., it reached the table stage in 66 days.



FIGURE 18.—Hundredfold.

PLANT

(Fig. 18)

Stem slender, 4 mm (one eighth inch) in diameter, zigzag, sometimes branched at nodes 1 and 2, comprising 15 nodes, bearing pods on nodes 10 to 14, inclusive. Height about 45 cm (18 inches), average internode 3 cm (1½ inches) long, longest 6.5 cm (2½ inches).

LEAVES

Leaves medium green (22 K 7), with 1 pair of leaflets up to the eleventh or twelfth node. Leaflets in 2

pairs, with 2 pairs of side tendrils. At the twelfth node the length of the rachis is 14 cm (5½ inches). The leaflets are ovate, obtuse at tip, with smooth margin. The first pair are about 44 mm (1¾ inches) long by 35 mm (1⅜ inches) broad. The second pair are 72 percent as long by 80 percent as broad as the first. They show slight marbling. The stipules are flat, acute at the tip, and at the twelfth node are 52 mm (2 inches) long by 40 mm (1½ inches) broad. The lobe extends 30 percent of the length of the stipule below its attachment and is dentate in margin. Stipules are abundantly marbled.

BLOSSOMS

(Fig. 2)

The blossoms are drooping, one to a peduncle, which is 2 cm (three fourths inch) long. The standard is 25 mm (1 inch) long by 32 mm (1¼ inches) broad; the wings are 22 mm by 18 mm (⅞ by ¾ inch); the keel is 14 mm (one half inch) long.

PODS

(Pl. 6 and fig. 8)

The pods are medium green (20 L 4), about 9 to 10 cm (3¾ to 4 inches) long by 16 mm (five eighths inch) broad. They are slightly curved, pointed with a small tip. The mature peduncles are from 1 to 5 cm (⅜ to 2 inches) long. The pods are roundish in cross section and contain 7 to 9 ovules, ripening 5 to 7 seeds.

PEAS

(Pl. 3)

Peas at table stage measure 15 by 8 by 11 mm (⅝ by ¼ by ⅜ inch). When dry, they are elongated, flat, wrinkled, and yellow to greenish. There are about 320 peas per 100 g (90 to the ounce).

HISTORY

Hundredfold was introduced by Sutton & Sons, of Reading, England, in 1910. Part of their original description reads "similar in growth to our Pioneer, but with darker foliage and still darker pods." In a recent letter the originators say its parents were Gradus and Sutton's Excelsior.

Carter of London, England, introduced a variety in 1870 that he called Hundredfold. This however, was a tall, late sort and very different from the one here described.

PERFECTION

Perfection is regarded in this publication as a form of Advancer and is partially described there.

(Figs. 3, 7, and 19 and pl. 6)

No statement concerning the origin of the Perfection by its originator, W. A. Davis, has been seen. It has been believed by some members of the seed firm by whom Mr. Davis was employed just prior to the introduction of the variety that Perfection is a selection of Bliss Abundance, which was closely related to Advancer, and so this is a possible history. The authors, however, believe it most probable that Perfection is the longer-vined form of Advancer.

It differs as follows from the Advancer, described on p. 32.

The plant is higher, reaching 75 to 80 cm (30 to 31 inches); the stem is thicker, being 7 mm (one fourth inch) in diameter; the peduncles are longer, measuring 6 to 10 cm ($2\frac{3}{8}$ to $3\frac{7}{8}$ inches); and the seed is larger, 12 by 8 by 10 mm ($\frac{1}{2}$ by $\frac{1}{4}$ by $\frac{3}{8}$ inch).

Perfection at present is planted to a greater acreage for canning than any other variety except Alaska. It holds this place because of its high productivity and its comparatively high quality. It is well adapted to fertile soil not infested by *Fusarium*.

The two varieties of wrinkled peas most popular for canning—Perfection and Admiral—are among the oldest wrinkled sorts now extant. They have both been retired from use for gardens by more recent introductions with larger pods and larger peas. The failure of these varieties to retain their popularity for home gardens does not prove that they are of lower quality, since preference has often been based on appearance or ability to hold up well under marketing conditions.



FIGURE 19 — Perfection. $\times \frac{1}{4}$.

ADVANCER

BRIEF CHARACTERIZATION

The second oldest variety on the present list. It was for a long time a standard home garden and canning variety.

It has a zigzag stem, 20 to 24 inches high, often branched at the base, bearing short, square-ended pods, with 5 to 8 peas. The ripe seeds are small, wrinkled, and usually green.

It has probably held its place so long on account of its earliness, hardness, productiveness, and dwarf stature.

ADAPTABILITY AND USE

Advancer, on account of its earliness and its robust growth, is adapted to a wide extent of territory extending well into the southern portion of the United States.

This variety and its variant form under the name of Cannors Perfection make the most important sorts of wrinkled peas in use in the United States for canning.



FIGURE 20.—Advancer. $\times \frac{1}{4}$.

Advancer holds its present place mainly as a canning pea. Its advantages are high productivity and comparatively high quality. It is well adapted to rich soil that is not infected with *Fusarium* wilt. There are at present a few canners who prefer the old type of Advancer rather than Perfection.

SEASON

This variety is late in season, 10 days to 2 weeks later than Alaska. At Sturgeon Bay, Wis., Advancer, planted in the first week of May, was ready for the table in 75 days.

PLANT

(Fig. 20)

Stem heavy, 6 mm in diameter, zigzag, green, 50 to 60 cm (20 to 24 inches) high. Number of nodes 21, often branched at nodes 1 and 2, and bearing pods on nodes 14 to 19, inclusive. Average node 2.6 cm (1 inch) long; longest node, 7 cm ($2\frac{3}{4}$ inches).

LEAVES

Leaves medium green (21 H 6), with 1 pair of leaflets to the tenth or eleventh node. The leaves have only 2 pairs of leaflets and 3 pairs of side tendrils. At the fourteenth node the rachis is about 20 cm ($7\frac{1}{2}$ inches) long. The leaflets are elliptical with acute tip, often mucronate with smooth margins. The leaflets measure approximately 66 mm ($2\frac{5}{8}$ inches) by 54 mm ($2\frac{1}{4}$ inches) for the first pair and 60 percent as long by 64 percent as broad for the second pair. The leaves show no marbling.

Stipules at the fourteenth node are wavy, acute at tip, often mucronate, 62 mm ($2\frac{1}{2}$ inches) long by 48 mm ($1\frac{7}{8}$ inches) broad. The lobe extends 38 percent of the length of the stipule below its attachment and has a dentate margin. The upper margin is smooth. The stipules show no marbling.

BLOSSOMS

(Fig. 2)

The blossoms are drooping, carried on peduncles 3 cm ($1\frac{1}{4}$ inches) long, 1 or 2 to the peduncle. The standard is 23 mm (seven eighths inch) long by 30 mm ($1\frac{1}{4}$ inches) wide; wings 19 mm (three fourths inch) by 15 mm (five eighths inch); keel 13 mm (one half inch) long.

PODS

(Pl. 2 and fig. 3)

Pods are medium green (20 K 5), about $7\frac{1}{2}$ cm (3 inches) long, straight, not quite square at the end, with a large tip. They are about $1\frac{1}{2}$ cm (five eighths

inch) broad. The mature peduncle varies from 3 to 6 cm ($1\frac{1}{4}$ to $2\frac{3}{8}$ inches) in length. The pods are round in cross section and have 7 to 9 ovules and ripen 5 to 8 peas.

PEAS

(Pl. 3)

Peas are of medium size, 11 mm by 9 mm by 8 mm ($\frac{3}{8}$ by $\frac{3}{8}$ by $\frac{1}{4}$ inch) at canning stage, green in color. The ripe seed is green in color, drum-shaped, wrinkled, with about 480 seeds per 100 g (134 in an ounce).

HISTORY

This pea was bred by Dr. McLean, of Colchester, England, and was introduced in 1860. The work of this physician followed that of Thomas Andrew Knight, who bred the first wrinkled peas. Very little is known of the parentage of his introductions. It can only be said that he used the best wrinkled peas to be had, and that he usually crossed them with Beck's Gem. Beck's Gem is better known to American buyers as Tom Thumb. This is a smooth, small-seeded, very dwarf, early pea. It has been listed in the United States by a few seedsmen within the last 10 years.

When introduced, Advancer was the earliest short-est-vined wrinkled pea. It immediately became very popular in England and in a few years was in the hands of American seedsmen. Its popularity was very widespread. After some 30 years' culture in this country, stocks of Advancer became somewhat mixed, and in selecting for uniformity two types of Advancer were developed. These have both been sold under this name since about 1895. Both types were furnished to the United States Department of Agriculture by seedsmen who cooperated in this study. One of these types is earlier and about 6 inches shorter than the other, and the peas are not quite so large.

In comparing these two types with the earlier descriptions it is quite evident that the earlier, shorter pea is more like the original Advancer. The description given above is for the shorter, earlier type.

Some 12 or 15 years ago, W. A. Davis, then at Bozeman, Mont., sold to canners a pea which was claimed to be a new variety, and which has been called Canner's Perfection. This variety has proved to be indistinguishable from the taller, later type of Advancer.

PROGRESS

BRIEF CHARACTERIZATION

A recent addition to the dwarf early, large-podded peas.

The plants are zigzag, about 18 inches high, and bear long, slightly curved, pointed pods. The peas are large, of good quality, and when dry are flat, wrinkled, and yellow, with some green peas.

ADAPTABILITY AND USE

Progress might be grown all over the United States but is as yet largely confined to the more northern districts. It will doubtless be used mostly for home gardens, though it would be an attractive shipping or market pea.

SEASON

Progress is second early, coming in a week or 10 days after Alaska. Planted in early May at Sturgeon Bay, Wis., it reached the table stage in 66 days.



FIGURE 21.—Progress. $\times \frac{1}{4}$.

PLANT

(Fig. 21)

The stem is medium slender, 4 mm (one eighth inch) in diameter, zigzag, green, comprising 15 nodes, often branched at nodes 1 and 2 and bearing pods at nodes 9 to 14, inclusive. Height 40 to 50 cm (16 to 20 inches). Each internode averages 3 cm (1½ inches), with the longest measuring 5 cm (2 inches).

LEAVES

Leaves dark green (22 H 6 a little darker), with one pair of leaflets up to the tenth or eleventh node. There are never more than 2 pairs of leaflets and 3 pairs of side tendrils. At the twelfth node the length of the rachis is about 12 cm (4¾ inches). The leaflets are elliptical, acute at the tip, with smooth margins. The leaflets measure 44 by 38 mm (1¾ by 1½ inches) for the first pair, and 60 percent as long by 63 percent as broad for the second. They show slight marbling. Stipules are wavy, acute at the tip, and at the twelfth node are about 50 mm (2 inches) long by 40 mm (1½ inches) broad. The lobe extends 36 percent of the length of the stipule below its attachment. They are abundantly marbled.

BLOSSOMS

(Fig. 2)

The blossoms are drooping, carried one to a peduncle, which is 1.5 cm (five eighths inch) long. The standard is 19 mm (three fourths inch) long by 24 mm (1 inch) broad; the wings are 17 by 14 mm (¾ by ½ inch); the keel is 14 mm (one half inch) long.

PODS

(Pl. 6 and fig. 8)

The pods are medium green (21 L 5), about 11 cm (4¾ inches) long by 18 mm (three fourths inch) broad. They are curved, with a pointed end and small tip. The mature peduncles measure from 2 to 7 cm (¾ to 2¾ inches). The pods are round, and contain 7 to 10 ovules and ripen 5 to 9 seeds.

PEAS

(Pl. 3)

Peas at table stage measure 13 by 9 by 9 mm (½ by ⅜ by ⅜ inch). When dry they are elongated, flat, wrinkled, green and yellow, and it requires about 330 peas to weigh 100 g (92 to the ounce).

HISTORY

Progress was introduced by Laxton Bros., of Bedford, England, successors to Thomas Laxton, in 1921. Its parents are said by the introducers to have been two unnamed seedlings.

It can be said to be a promising variety, and it is rapidly increasing in favor with truckers in southern California.



L. C. C. KRIEGER, PINX

LITHO EASTERN OFFSET INC. BALTO

A plant of the Laxtonian variety showing a typical dark-green foliated variety. $\times \frac{3}{4}$.

LAXTONIAN

BRIEF CHARACTERIZATION

Laxtonian is the most important representative of the dwarf early, large-podded group. The stems are zigzag, about 18 inches high, with long, slightly curved, pointed pods. The peas are large, flat, and wrinkled when dry, and usually yellow in color.

ADAPTABILITY AND USE

Laxtonian is mainly a home-garden sort and is early enough to be grown in all parts of the United States, though its main popularity has been in the North. It is also used for nearby market and for long-distance shipping. It has not been canned and is rapidly being superseded by newer varieties.

SEASON

Laxtonian is an early variety. Planted at Sturgeon Bay, Wis., in early May, it was ready for table use in 66 days.

PLANT

(Fig. 22 and pl. 7)

Stem slender, 4 mm (one eighth inch) in diameter, zigzag, light green, not branched, comprising 14 nodes, and bearing pods on nodes 9 to 12, inclusive. Height 40 to 45 cm (16 to 18 inches), average length of internodes 2.8 cm (1 1/8 inches), longest internode 6.5 cm (2 1/2 inches).

LEAVES

Leaves light green (22 L 7), with one pair of leaflets up to tenth or eleventh node. There are 2 pairs of leaflets and 3 pairs of side tendrils. At the tenth node the length of the rachis is about 14 cm (5 1/2 inches). The leaflets are ovate, with obtuse tip and smooth margins. The first leaflets measure approximately 40 by 33 mm (1 5/8 by 1 1/4 inches), and the second pair are 70 percent of this length by 76 percent of this breadth. They show slight marbling.

The stipules are wavy, acute at the tip, and at the tenth node are 45 mm (1 3/4 inches) long by 30 mm (1 1/8 inches broad). The lobe extends 22 percent the length of the stipule below its attachment and has a dentate margin. The upper margin of the stipule is smooth. The stipules are abundantly marbled.

BLOSSOMS

(Fig. 7)

The blossoms are drooping, carried 1 to a peduncle (some peduncles bear 2), which is 1.5 cm (five eighths inch) long. The standard is 18 mm (three fourths inch) long by 24 mm (1 inch) broad; the wings are 17 mm (five eighths inch) by 13 mm (one half inch); the keel is 13 mm (one half inch) long.

PODS

(Pl. 6 and fig. 8)

Medium green (a little lighter than 20 I 5). The pods are about 9 cm (3 1/2 inches) long by 17 mm (five eighths inch) broad. They are curved, pointed, with a small tip. The mature peduncle varies from 2 to 6 cm (3/4 to 2 3/8 inches) long. The pods contain from 7 to 9 ovules and mature 5 to 8 seeds.

PEAS

(Pl. 3)

The peas are large at table stage, 14 by 9 by 11 mm (1/2 by 3/8 by 3/8 inch), and are green in color. When



FIGURE 22.—Laxtonian. $\times \frac{1}{4}$.

dry, the seeds are elongated, flat, wrinkled, and yellow, with a few green seeds. There are about 350 seeds per 100 g (98 to the ounce).

HISTORY

Laxtonian was originated by Laxton Bros., of Bedford, England, successors of Thomas Laxton, and was introduced in 1910. It is described as originating from unnamed seedlings.

The samples furnished by the cooperating seedsmen consisted of 2 strains, 1 much darker green and somewhat larger and later than the other. The description above is of the light-foliaged sort that is believed by the writers to be the original type. The darker strain has been sold as Blue Bantam but is also sold as Laxtonian.

DAISY

BRIEF CHARACTERIZATION

Daisy is one of the latest peas on this list.

It produces a heavy zigzag stem about 20 inches high, which carries long, nearly straight, light-green pods, with pointed ends.

Its foliage is very dense and heavy, giving the plant a distinctive appearance.

ADAPTABILITY AND USE

The Daisy variety is so late that as a home-garden variety it is only popular where the season is fairly long. It is well adapted to the southern regions where most of the winter is mild enough for growth.

Daisy has been used in home gardens, but on account of its large pods it has been most popular for long-distance shipment. It is not regarded as of very high quality.



FIGURE 23.—Daisy. $\times \frac{1}{4}$.

SEASON

This is, for the United States, a late variety, maturing about with the Telephone. Planted at Sturgeon Bay, Wis., in early May, it reached table stage in 73 days.

PLANT

(Fig. 23)

The stem is heavy, 7 mm (one fourth inch) in diameter, zigzag, light green, sometimes branched at nodes 1 and 2, comprising 19 nodes and bearing pods at nodes 13 to 18, inclusive. Height 45 to 55 cm (18 to 22 inches), average length of internode 2.6 cm (1 inch). Longest internode 5 cm (2 inches).

LEAVES

Leaves light green (21 K 4), lower leaves darker, with 1 pair of leaflets up to the twelfth or thirteenth node. There are not more than 2 pairs of leaflets and 3 pairs of side tendrils. At the thirteenth node the length of the rachis is about 19 cm ($7\frac{1}{2}$ inches). The leaflets are ovate, obtuse at the tip, with smooth margins. The leaflets measure approximately 66 mm ($2\frac{5}{8}$ inches) by 56 mm ($2\frac{1}{4}$ inches) for the first pair, and 72 percent as long by 82 percent as broad for the second pair. They show slight marbling. Stipules are very wavy, obtuse at the tip, and at the thirteenth node are 62 mm ($2\frac{1}{2}$ inches) long by 58 mm ($2\frac{1}{4}$ inches) broad. The lobe extends 48 percent of the length of the stipule below its attachment and is dentate in margin. The stipules are abundantly marbled.

BLOSSOMS

(Fig. 7)

Blossoms are greenish white, drooping, carry 1 to 2 to the peduncle, which is 2 cm (three fourths inch) long. The standard is 25 mm (1 inch) long by 34 mm ($1\frac{3}{8}$ inches) broad; the wings are 21 mm by 18 mm ($\frac{7}{8}$ by $\frac{3}{4}$ inch); the keel is 14 mm (one half inch) long.

PODS

(Pl. 4 and fig. 8)

Pods are light green (20 K 4), about 11 cm ($4\frac{3}{8}$ inches) long by 2 cm (three fourths inch). They are slightly curved, pointed, with a small tip. The mature peduncles measure from 3 to 7 cm ($1\frac{1}{8}$ to $2\frac{3}{4}$ inches). The pods are round in cross section, and contain 7 to 10 ovules, ripening 5 to 8 seeds.

PEAS

(Pl. 3)

Peas at the table stage measure 13 by 9 by 11 mm ($\frac{1}{2}$ by $\frac{3}{8}$ by $\frac{3}{8}$ inch). When dry, they are squarish-elongated, flat, wrinkled, green, and about 360 peas weigh 100 g (101 to the ounce).

HISTORY

Daisy was introduced by Carter, of London, England, in 1892. Its parents were Stratagem crossed with an unnamed seedling with Stratagem ancestry. At the time of its introduction the prevalent taste in color of pods favored a light-green pod. This character of Daisy is not now regarded as an asset.

It has often been called Dwarf Telephone. Whether there ever was a distinct variety of Dwarf Telephone other than Daisy is now very uncertain.

Since dark-green podded peas are now more in favor among truckers there has been a decided trend toward the substitution of Daisy's parent variety, Stratagem, for Daisy, and at present there are several

Stratagem selections that are making considerable headway among long-distance shippers in Mexico and southern California. These selections have been made for greater thickness of pod wall to insure better shipping qualities and greater frost resistance for Imperial Valley winter conditions.

SUTTON EXCELSIOR

BRIEF CHARACTERIZATION

Sutton Excelsior is an early, dwarf, short-podded pea. Its stem is zigzag about 24 inches high, light green in color, and bears pods of medium length, almost straight, with blunt ends. The seeds are light green, and when ripe are flat, wrinkled, and greenish yellow.

ADAPTABILITY AND USE

Sutton Excelsior has been popular in the northern part of the country, being used mainly for a home garden sort. It is early enough to be grown in all parts of the United States.

SEASON

This variety is early in season, coming into use within a few days of Alaska. Planted in early May at Sturgeon Bay, Wis., it has reached table stage in 66 days.



FIGURE 24.—Sutton Excelsior. $\times \frac{1}{4}$.

PLANT

(Fig. 24)

Stem medium size, 5 mm (one fourth inch) in diameter, zigzag, light green, often branched at nodes 1 and 2, producing 19 nodes in all, and bearing pods on nodes 11 to 18, inclusive. Height 50 to 60 cm (20 to 24 inches). Internodes average 2.6 cm (1 inch). The longest measures about 6 cm ($2\frac{3}{8}$ inches).

LEAVES

Leaves light green (21 J 7 to 22 L 7), with 1 pair of leaflets up to the tenth or the eleventh node. There

are but 2 pairs of leaflets developed and 2 pairs of side tendrils. At the thirteenth node the length of the rachis is about 16 cm ($6\frac{1}{4}$ inches). The leaflets are ovate, obtuse at the tip, with a smooth margin. The first pair measure approximately 59 mm ($2\frac{3}{4}$ inches) by 45 mm ($1\frac{3}{4}$ inches), and the second pair are 71 percent as long by 80 percent as broad. The leaflets are slightly marbled.

Stipules are wavy, obtuse at the tip, and at the thirteenth node are 58 mm ($2\frac{1}{4}$ inches) long by 52 mm (2 inches) broad. The lobe extends 46 percent of the length below its attachment and is dentate. The upper margin of the stipule is smooth. The stipules show moderate to heavy marbling.

BLOSSOMS

(Fig. 2)

The blossoms are drooping, carried 1 or 2 to the peduncle, which is about $1\frac{1}{2}$ cm (five eighths inch) long. The standard is about 23 mm (1 inch) long by 30 mm ($1\frac{1}{4}$ inches) broad; the wings are 20 mm (three fourths inch) by 16 mm (five eighths inch); the keel is 14 mm (one half inch) long.

PODS

(Pl. 6 and fig. 8)

The pods are about 8.5 cm ($3\frac{3}{8}$ inches) long by 1.6 cm (five eighths inch) broad, very slightly curved, with the end almost square, and a medium-sized tip. They are light-yellowish green, a little paler and yellower than 20 L 5. The mature peduncle varies from 1 to 4 cm ($\frac{3}{8}$ to $1\frac{1}{2}$ inches) long. The pods hold 7 to 9 ovules and produce 5 to 8 peas.

PEAS

(Pl. 3)

The peas at usable stage are large, 13 by 8 by 9 mm ($\frac{1}{2}$ by $\frac{1}{4}$ by $\frac{3}{8}$ inch) and are light green.

The dry seeds are elongated, flat, greenish yellow, and wrinkled. About 330 seeds weigh 100 g (92 to the ounce).

HISTORY

This variety was bred by Thomas Culverwell, of England, in 1887. He sold his stock to Sutton & Sons, who introduced it in 1896. Its parents were announced by the Suttons to be Paragon pollinated by American Wonder. It was soon brought to the United States and has since enjoyed moderate popularity.

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